Trans-Lake Washington Project
Final Local Traffic Results Report

Prepared for

Washington State Department of Transportation
Office of Urban Mobility
401 Second Avenue South, Suite 300
Seattle, Washington 98104

Sound Transit
401 South Jackson Street
Seattle, Washington 98104

Prepared by

Trans-Lake Washington Project Team
Trans-Lake Washington Project Office
401 South Jackson Street
Seattle, Washington 98104

Parametrix, Inc.
CH2M HILL
Parsons Brinckerhoff

ACRONYMS

AADT	Average Annual Daily Traffic
ADT	Average Daily Traffic
BRT	Bus Rapid Transit
EB	Eastbound Traffic Flow
EBL	Eastbound Left Turn
EBLR	Eastbound Shared Left-Right Turn Lane (or movement)
EBR	Eastbound Right Turn
EBT	Eastbound Through Traffic Movement
EBTR	Eastbound Shared Through-Right Turn Lane (or movement)
GMA	Growth Management Act
GP	General Purpose (Lane)
HCM	*2000 Highway Capacity Manual*
HCT	High Capacity Transit
HOV	High-occupancy Vehicle
HSP	Highway System Plan
LOS	Level of Service
NB	Northbound Traffic Flow
NBL	Northbound Left Turn
NBLR	Northbound Shared Left-Right Turn Lane (or movement)
NBR	Northbound Right Turn
NBT	Northbound Through Traffic Movement
NBTR	Northbound Shared Through-Right Turn Lane (or movement)
RCW	Revised Code of Washington
ROW	Right-of-way
SB	Southbound Traffic Flow
SBL	Southbound Left Turn
SBLR	Southbound Shared Left-Right Turn Lane (or movement)
SBR	Southbound Right Turn
SBT	Southbound Through Traffic Movement
SBTR	Southbound Shared Through-Right Turn Lane (or movement)
SEPA	State Environmental Policy Act

ACRONYMS (Continued)

SPL	Signal Priority List
TDM	Travel Demand Management
TEA-21	Transportation Equity Act for the 21st Century
TSM	Transportation Systems Management
VPH	Vehicles Per Hour
WAC	Washington Administrative Code
WB	Westbound Traffic Flow
WBL	Westbound Left Turn
WBR	Westbound Right Turn
WBT	Westbound Through Traffic Movement
WSDOT	Washington State Department of Transportation
WTP	Washington Transportation Plan

2. INTRODUCTION AND DESCRIPTION OF ALTERNATIVES

This report documents the Trans-Lake Washington Project Local Traffic Alternatives Analysis, combining multi-modal analysis results for both the Westside and Eastside. The Westside refers to the area including affected interchanges and selected intersections in the SR 520 corridor vicinity west of the Evergreen Point Floating Bridge, including some along the I-5 corridor. I-5 intersection analysis begins with the Stewart Street interchange on Interstate 5, continuing north to the Harvard/Roanoke interchange at the SR 520 connection. The Eastside segment covers the SR 520 corridor, including affected interchanges and selected intersections, from the Evergreen Point Floating Bridge east to the SR 520 terminus at the Avondale Interchange at Union Hill Road.

2.1 ALTERNATIVES CONSIDERED

The September 2001 Trans-Lake Washington Project Local Traffic Alternatives Development and Assessment Report considered eight multimodal alternatives with a range of highway, high capacity transit (HCT) and transportation demand management (TDM) actions for the SR 520 and I-90 corridors. For SR 520 a range of 4-lane, 6-lane and 8-lane were considered.

Alternatives 1 and 2 retain a 4-lane cross section on SR 520. Alternative 1 is the No Action Alternative, while Alternative 2 would replace and realign the floating bridge and seismically deficient structures, add bicycle/pedestrian facilities and shoulders, and implement aggressive strategies to manage transportation demand. Alternative 2 also adds light-rail transit (LRT) on I-90. This alternative is termed the Safety and Preservation Alternative, or S&P. For the analysis of local traffic impacts, Alternatives 1 and 2 were assumed to be the same. With these alternatives, the freeway interchange configurations were assumed to remain the same as existing conditions.

Alternatives 3, 5, and 7 all consist of two GP lanes and one continuous HOV lane in each direction (six lanes total). Variations among these 6-lane Alternatives are related to their treatment of high capacity transit. Only Alternative 3 was evaluated for impacts to local streets, since the impacts of all six-lane alternatives would be similar. Alternative 3 is referred to as the 6-Lane Alternative throughout this report.

Similarly, Alternatives 4, 6, and 8 consist of three GP lanes and one continuous HOV lane in each direction (eight lanes total), with auxiliary lanes in various locations. Variations among the 8-lane alternatives are also related to their treatment of high capacity transit. Only Alternative 4 was evaluated for impacts to local streets, since the impacts of all eight-lane alternatives would be similar. Alternative 4 is referred to as the 8-Lane Alternative throughout this report.

All three 2030 Build alternatives focus on improvements in the SR 520 corridor, and include:

4. 4 Lanes - Maintaining the current four lanes of capacity of SR520 while replacing the floating bridge, providing shoulders to standards, and strengthening or replacing sections of the corridor vulnerable to earthquakes. The local traffic impacts of this alternative, called the Safety & Preservation (S&P) Alternative, are identical to the No Action Alternative.

5. 6 Lanes - Adding one combined high-occupancy vehicle (HOV)/bus rapid transit (BRT) lane in each direction on SR 520.

6. 8 Lanes -Adding one HOV/BRT lane and one general purpose (GP) lane in each direction on SR 520.

On September 5, 2002 the Trans-Lake Washington Project Executive Committee selected a preliminary preferred alternative: the 6-lane plan with expanded bridge pontoons to accommodate future high capacity transit on SR 520. Consideration of a future light rail transit (LRT) line in the I-405 corridor was also recommended, independent of any HCT option ultimately selected for the SR 520 corridor. Design work on the preliminary preferred alternative continues; the DEIS will evaluate a number of additional design modification concepts and improvements.

Tables 12 and 13 describe the alternatives that were evaluated as part of the local traffic impacts analysis, as well as the interchange configurations assumed for each alternative. Only interchanges modified by the future build alternatives are listed.

The following chapters include Methodology and Assumptions; Westside Local Traffic Analysis; Eastside Local Traffic Analysis; and a combined Eastside and Westside Local Traffic Analysis summary including comparisons between the Year 2030 alternatives of PM peak hour intersection levels of service and critical queues.

Figures summarizing analysis volumes and results are included in the Appendix. The appendix figures are grouped by interchange from west to east through the Trans-Lake study corridor, with each group covering Existing, 2030 No Action, 2030 6-Lane Build, and 2030 8-Lane Build conditions.

Table 12. SR 520 Alternatives Evaluated for Westside Local Impacts

SR 520 Alternative	Analysis Year	SR 520 Freeway Section	Modified Interchanges			
			I-5/Stewart/Mercer	I-5/SR 520/ Harvard/Roanoke	Montlake/Pacific	Lake Washington Blvd.
Existing	2000-2001	2 GP lanes in each direction	SB off-ramp to Stewart St.; NB on-ramp from Howell St./Denny Way; NB and SB on/off ramps connecting to Mercer St.	Freeway-to-freeway ramps connecting NB and SB I-5 to EB and WB SR 520; SR 520 WB off-ramp to Harvard Ave. at Roanoke St.	WB SR 520 off-ramp to NB Montlake Blvd.; WB SR 520 on-ramp from SB Montlake Blvd.; EB SR 520 off-ramp; EB SR 520 on-ramp from NB/SB Montlake Blvd.	WB SR 520 off-ramp and EB SR 520 on-slip-ramps.
No Action	2030	2 GP lanes in each direction.	Same as Existing.	Add sound walls.	Ped/bike underpass	Reconstruct SR 520 WB off/EB on ramps; ped/bike underpass
S&P[1]	2030	Same as No Action.	Same as No Action.	Add direct connection between SR 520 and I-5 express lanes to the south.	Same as No Action.	Reconstruct SR 520 WB off/EB on ramps; ped/bike underpass
6-Lane	2030	2 GP lanes and 1 HOV lane in each direction.	Added I-5 SB GP lane.	New SB I-5 to EB SR 520 freeway-to-freeway ramp; 2nd WB HOV lane. Full direct connection between SR 520 HOV lanes and I-5 express lanes.	Widen Montlake overcrossing; widen Montlake to Pacific adding 1 NB GP lane and 1 SB HOV lane (Option M only); realign Montlake/ Roanoke; ped/bike underpass; additional intersection design enhancements to be analyzed in the DEIS.	Reconstruct SR 520 WB off/EB on ramps.
8-Lane	2030	3 GP lanes and 1 HOV lane in each direction	Same as 6-Lane.	Same as 6-Lane.	Widen Montlake overcrossing; widen Montlake to 3 lanes each direction, SR 520 to 25th Ave.; additional intersection design enhancements to be analyzed in the DEIS.	Extend Pacific St. east of Montlake to new SR 520 WB off/EB on ramps; replace existing Lake Washington Blvd. ramps

1 Standards and Preservation Alternative.

Table 13. SR 520 Alternatives Evaluated for Eastside Local Impacts

SR 520 Alternative	Analysis Year	SR 520 Freeway Section	Modified Interchanges			
			Bellevue Way & 108th Avenue NE	124th Avenue NE	40th/51st Avenues NE	West Lake Sammamish Parkway
Existing	2000-2001	2 GP lanes in each direction, WB HOV lane between W. Lake Sammamish and 84th Ave NE.	Partial cloverleaf at Bellevue Way. 108th has SR 520 EB on-ramp, with WB on and off-ramps.	SR 520 EB off-ramp and a WB on-ramp.	CD system for both SR 520 EB and WB connecting 40th and 51st with a split diamond interchange.	SR 520 EB on and off-ramps. WB on and off-ramps.
No Action	2030	2 GP lanes in each direction, WB HOV lane between W. Lake Sammamish and 84th Ave NE. Parallel ped/bike path.	Same as Existing.	Same as Existing.	Same as Existing.	Same as Existing.
S&P[1]	2030	2 GP lanes in each direction, WB HOV lane between W. Lake Sammamish and 84th Ave NE. Parallel ped/bike path.	Same as Existing.	Same as Existing.	Same as Existing.	Same as Existing.
6-Lane	2030	2 GP lanes and 1 HOV lane in each direction west of W. Lake Sammamish. 2 GP and 1 HOV lane in each direction between SR 202 and Union Hill Road. Parallel ped/bike path. Parallel ped/bike path.	New interchange with full directional access from Bellevue Way. Access to 108th Avenue NE through Bellevue Way interchange.	Braided ramps at 124th restrict access from I-405 to and from 124th.	Same as Existing.	Same as Existing.
8-Lane	2030	3 GP lanes and 1 HOV lane in each direction west of W. Lake Sammamish. 2 GP lanes and 1 HOV lane in each direction between W. Lake Sammamish and Union Hill Road. Parallel ped/bike path.	Same as 6-Lane.	Same as 6-Lane.	Braided ramp design of 40th and 51st interchanges in both directions due to the increased width requirements of the freeway section. Removal of the CD system.	Left turning SR 520 EB off-ramp traffic diverted to Leary Way intersection combining with WB ramps.

Table 13 (cont'd). SR 520 Alternatives Evaluated for Eastside Local Impacts

SR 520 Alternative	Analysis Year		Modified Interchanges			
		84th Avenue NE	92nd Avenue NE	Avondale Road NE	SR 202/Redmond Way	Northup Way
Existing	2000-2001	Half diamond interchange with service to/from the west.	Half diamond interchange with service to/from the east.	SR 520 EB off-ramp and a WB on-ramp.	SR 520 EB off-ramp and a WB on-ramp.	Local arterial.
No Action	2030	Same as Existing.	Same as Existing.	Same as Existing.	Same as Existing.	Same as Existing.
S&P[1]	2030	Same as Existing.	Same as Existing.	Same as Existing.	Same as Existing.	Same as Existing.
6-Lane	2030	Same as Existing.	Same as Existing.	Same as Existing.	WB-to-SB flyover direct connection replacing WB left to WB SR 520.	I-405 diamond interchange.
8-Lane	2030	Same as Existing.	Same as 6-Lane.	Same as Existing.	Same as 6-Lane.	Same as 6-Lane.

1 Standards and Preservation Alternative.

3. METHODOLOGY AND ASSUMPTIONS

3.1 TRAFFIC VOLUME FORECASTS

Traffic conditions were analyzed for the morning and late afternoon peak periods, both for conditions in the base year (year 2000) and future horizon year (year 2030). Daily and peak hour traffic volumes were collected from the cities of Seattle, Bellevue, Redmond, and Kirkland and the Points Communities (Medina, Clyde Hill, Hunt's Point, Yarrow Point) for study area roadways and intersections. Traffic counts were conducted by TC^2 for locations where data was not available. Future (year 2030) freeway mainline and ramp traffic volumes were developed using growth rates at screenline locations, based on information from the PSRC regional travel demand model.

For Westside traffic analysis, 2030 background growth factors were developed from the PSRC model and applied to existing traffic volumes to create No Action volumes. For both Eastside and Westside, the difference in 2030 and existing ramp AM and PM peak period volumes near each SR 520 interchange was added to existing local street traffic volumes and distributed based on existing traffic circulation patterns to/from each freeway ramp. Freeway ramp volumes were reassigned, where appropriate, to evaluate the impacts of ramp closures and revised interchange configurations on local street traffic.

3.2 STUDY AREA AND ANALYSIS TIME PERIODS

At each existing interchange and new ramp connection to SR 520, the comparative traffic analysis was conducted at major intersections adjacent to SR 520. Traffic analysis was also conducted where geometric changes were proposed with one or more of the Build alternatives, such as along Montlake Boulevard north of SR 520 to 25th Avenue NE. Analysis results at intersections farther into the local street networks would generally be expected to exhibit similar comparative patterns from one alternative to another.

Traffic conditions for street systems typically are measured for a single peak hour during the longer AM and PM weekday commuter peak periods. During the AM commute period, existing freeway volumes in the study area generally peak from 7:45 AM to 8:45 AM and during the PM commute peak from 5:00 PM to 6:00 PM. However, to ensure a conservatively high analysis, peak hour volumes for the traffic analysis are based on the highest 15-minute freeway flows during the 6:00 AM to 9:00 AM morning peak period and the 3:00 PM to 6:00 PM late afternoon peak period overlaid upon the local street AM and PM peak hour volumes. These hourly demand volumes based on peak flow rates were used as the baseline to which model-generated growth factors were applied to evaluate local traffic impacts.

3.3 LOCAL TRAFFIC PERFORMANCE MEASURES

Local traffic impacts were analyzed by using unconstrained peak hour demand volumes to calculate intersection levels of service (LOS), which are based on average delay per vehicle. Besides LOS and delay, average vehicle queue lengths were also analyzed. More detailed traffic

operations analysis reflecting the effect of freeway traffic congestion on local traffic operations will be conducted as part of the Trans-Lake Washington Project EIS.

Level of service (LOS) is often used as a standard by which jurisdictions identify the need for transportation improvements and assess the impacts that growth would have on transportation system operations. Level of service (LOS) was calculated at all freeway ramp terminus intersections that would be impacted by the freeway widening alternatives. Additional intersections were analyzed if direct impacts would be expected from proposed interchange options, such as along Montlake Boulevard where widening is proposed as part of the 8-lane Build Alternative. Synchro (traffic analysis software) was used for evaluating all signalized and unsignalized intersections. Synchro follows the intersection analysis methodology outlined in the *2000 Highway Capacity Manual* (HCM) for signal-controlled or stop sign controlled intersections. Average queues estimated by Synchro are also reported, to determine where potential operational impacts could be created by peak hour turning movement queues exceeding available storage, or where overall intersection queues could spill back into adjacent intersections. Synchro also provides simulation capability with SimTraffic, which was employed to evaluate potential design modifications and intersection improvements.

The HCM uses six levels of service to describe the operational performance of an intersection. These range from LOS A, which indicates a relatively free-flowing condition, to LOS F, which indicates operational breakdown. LOS D is usually considered the minimum standard in urban areas. With this level of service, some delays are expected for certain traffic movements. LOS E or F is sometimes accepted in urban areas at locations with environmental constraints or at ultimate build-out.

The HCM methodology for signalized intersection analysis was used for signal-controlled intersections. At these intersections, level of service is related to control delay per vehicle as they approach the intersection. Table 14 summarizes the relationship between level of service and control delay for signalized intersections.

Table 14. Level of Service Criteria for Signalized Intersections

Level of Service	Control Delay (seconds per vehicle)
A	≤ 10.0
B	> 10.0 - ≤ 20.0
C	> 20.0 - ≤ 35.0
D	> 35.0 - ≤ 55.0
E	> 55.0 - ≤ 80.0
F	> 80.0

Source: 2000 Highway Capacity Manual.

The HCM methodology for two-way and all-way stop-controlled intersections was used to analyze the unsignalized intersections near each interchange. At these unsignalized intersections, level of service is also based on control delay. The relationship between various levels of service and delay for unsignalized intersections is shown in Table 15.

LOS D is used in most urban areas in the Puget Sound region as the minimum acceptable level of service for planning purposes. Some jurisdictions impacted by the Trans-Lake Washington Project may determine that LOS E or F is acceptable at intersections; however, for purposes of this study, LOS D has been employed as a minimum level of service threshold to begin identifying existing and potential future deficiencies in the study area.

Table 15. Level of Service Criteria for Unsignalized Intersections

Level of Service	Control Delay (seconds per vehicle)
A	≤ 10.0
B	> 10.0 - ≤ 15.0
C	> 15.0 - ≤ 25.0
D	> 25.0 - ≤ 35.0
E	> 35.0 - ≤ 50.0
F	> 50.0

Source: 2000 Highway Capacity Manual.

3.4 LOCAL STREET AND INTERSECTION IMPROVEMENTS

Tables 16 and 17 highlight the analysis locations requiring additional design modifications to accommodate 2030 AM and/or PM peak hour demand volumes with either of the 2030 Build alternatives. Design modifications were triggered by the threshold adopted specifically for the Trans-Lake Project traffic analysis: intersection LOS with either 6-Lane or 8-Lane Build alternative volumes should be no worse than the comparable 2030 No Action LOS, and average intersection delay should increase by no more than five seconds. Meeting or exceeding 2030 No Action conditions is a more stringent standard than required in an Environmental Impact Statement (EIS). For this reason, and because the project design continues to be refined, changes are referred to as design modifications instead of mitigation measures.

Twenty-six intersections are projected to operate at or below LOS E with 2030 No Action volumes, including 8 Westside intersections and 18 on the Eastside. With the 2030 6-Lane Build alternative, 17 of the Westside intersections analyzed operate worse than with 2030 No Action volumes, triggering the need for additional design modifications. Another 18 Eastside analysis locations exceed the 2030 No Action threshold. With the design modifications assumed in the traffic analysis, 20 intersections are projected to operate at LOS E or LOS F. A design option for the 2030 6-Lane Build alternative provides a second parallel Montlake Bridge. This design option was analyzed at four intersections, and did not affect the number of design modifications needed. New traffic signals were not considered design modifications.

With the 2030 8-Lane volumes, 16 Westside and 25 Eastside intersections exceed the 2030 No Action threshold and require additional design modifications. With potential design modifications reflected in the traffic analysis, 16 intersections are projected to operate at LOS E or LOS F with the 8-Lane Build alternative.

Tables 16 and 17 show a checkmark (✓) for intersections projected to operate at LOS E or F with 2030 traffic. A circle (●) under the 2030 Build alternatives indicates intersections requiring design modifications to meet the 2030 No Action threshold. A check mark and a circle together (✓●) indicate that the intersection is projected to operate at LOS E or LOS F with the recommended design modification. Design modifications assumed in the analysis are described in the chapter text.

Table 16. Westside Impact Locations

Locations	2030 No Action	2030 6-Lane	6-Lane with 2nd Montlake Bridge	2030 8-Lane
I-5/Stewart St. Interchange				
Denny Way/Stewart St.		●		●
John St./Eastlake Ave.		●		●
I-5/Mercer St. Interchange				
Mercer St./Fairview Ave./I-5 Ramps	✓	✓●		✓●
Valley St./Fairview Ave. N	✓	●		●
SR520/Harvard Ave. Interchange				
Roanoke St./10th Ave. E		●		●
Harvard Ave./Roanoke St./SR 520 WB Off Ramp	✓	✓●		✓●
SR520/Montlake Blvd. Interchange				
Montlake Blvd./Roanoke St.				
Lake Washington Blvd./SR 520 EB On/WB Off Ramps	✓	●	●	●
Montlake Blvd. NE/SR 520 EB Ramp	✓	✓	✓	✓
Montlake Blvd. NE/SR 520 WB Ramp		●	●	●
Montlake Blvd. NE/E Shelby St.	✓	✓●		
Montlake Blvd. NE/NE Pacific St.	✓	✓●		✓●
Montlake Blvd. NE/NE Pacific Pl.	✓	✓●		✓●
Montlake Blvd. NE/25th Ave. NE		●		●
Montlake Blvd./Walla Walla Rd./NE 44th St.		●		●
Montlake Blvd./NE 45th St.		●		●
25th Ave. NE/Pend Oreille Rd./NE 44th St.		●		●
NE Pacific St./NE Pacific Pl.		●		●
NE Pacific St./15th Ave. NE		●		●

✓ = LOS E/F locations.

● = Design modification necessary: Alternative LOS is worse than 2030 No Action, or delay per vehicle exceeds 2030 No-Action delay by more than 5 seconds.

= Not analyzed: the Build alternative either results in operations better than 2030 No Action, or eliminates the intersection. For the 6-lane Build Alternative with parallel 2nd Montlake Bridge, indicates the area was outside the impact area of the design alternative.

Table 17. Eastside Impact Locations

Locations	2030 No Action	2030 6-Lane	2030 8-Lane
84th Ave NE Interchange			
84th Avenue NE/SR 520 WB On-ramp			
84th Avenue NE/Hunts Point Circle	✓	✓●	✓●
92nd Ave NE Interchange			
92nd Avenue NE/SR 520 WB Off-ramp	✓	✓●	✓●
92nd Avenue NE/SR 520 EB On-ramp			
Bellevue Way Interchange			
Bellevue Way/NE 38th Pl.	✓	●	●
Bellevue Way/Northup Way			
Bellevue Way/NE Points Drive		✓●	●
Bellevue Way/SR520 WB On/EB Off Ramps			●
Bellevue Way/SR 520 EB On/WB Off Ramps			
Bellevue Way/NE 34th Pl.			
108th Ave. NE Interchange			
108th Ave. NE/SR 520 EB On-Ramp	✓		
108th Ave. NE/ SR 520 WB Ramps			
108th Avenue NE/Northup Way	✓	●	✓
108th Ave. NE/HOV Direct Access Ramps			
108th Ave. NE/NE 34th Pl.			
124th Ave. NE Interchange			
124th Ave. NE/Northup Way		●	●
120th Ave. NE/Northup Way			
NE 24th St./Northup Way			
116th Ave. NE(north T)/Northup Way			
116th Ave. NE(south T)/Northup Way			
I-405 NB On & Off Ramps/Northup Way			
I-405 SB On & Off Ramps/Northup Way			
148th Ave. NE Interchange			
148th Ave. NE/NE 24th St.	✓	✓●	✓●
148th Ave. NE/SR 520 EB Ramps			●
148th Ave. NE/SR 520 WB Ramps/NE 29th St.	✓	✓	✓●

✓ = LOS E/F locations.

● = Design modification necessary: Alternative LOS is worse than 2030 No Action, or delay per vehicle exceeds 2030 No-Action delay by more than 5 seconds.

= Not analyzed: the Build alternative either results in operations better than 2030 No Action, or eliminates the intersection. For the 6-lane Build Alternative with parallel 2nd Montlake Bridge, the area was outside the impact area of the design alternative.

Table 17 (cont'd). Eastside Impact Locations

Locations	2030 No Action	2030 6-Lane	2030 8-Lane
NE 40th St. Interchange			
NE 40th Street/SR 520 WB Ramps			●
NE 40th Street/SR 520 EB Ramps		●	●
NE 40th Street/156th Avenue NE	✓	✓●	✓●
NE 51st St. Interchange			
NE 51st Street/SR 520 WB Ramps			●
NE 51st Street/SR 520 EB Ramps			●
West Lake Sammamish Pkwy. Interchange			
SR 520 EB Ramps/ W Lake Sammamish Pkwy.	✓	✓	✓●
SR 520 WB Ramps/ W Lake Sammamish Pkwy./Leary Way NE	✓	✓●	✓●
159th PL. NE/NE Leary Way	✓	✓●	✓●
Bear Ck. Pkwy/NE Leary Way	✓	✓●	✓●
Bear Ck. Pkwy/NE 74th St.	✓		
Redmond Way Interchange			
Redmond Way/SR 520 WB On-Ramp	✓	●	✓●
Redmond Way/SR 520 EB Off-Ramp		✓●	✓●
NE 76th St./SR 520 WB Off-Ramp	✓		●
NE 76th St./SR 520 EB On-Ramp			
Redmond Way/NE 70th St.	✓	✓●	✓●
E Lake Sammamish/180th Ave /Redmond Way		●	✓●
Avondale Way Interchange			
Avondale Rd. NE/NE Union Hill Rd.			
NE Union Hill Rd./Avondale Rd. Extension	✓	✓●	✓●
Avondale 520 Extension/Avondale Rd. NE	✓	✓●	✓●

✓ = LOS E/F locations.

● = Design modification necessary: Alternative LOS is worse than 2030 No Action, or delay per vehicle exceeds 2030 No-Action delay by more than 5 seconds.

= Not analyzed: the Build alternative either results in operations better than 2030 No Action, or eliminates the intersection. For the 6-lane Build Alternative with parallel 2nd Montlake Bridge, the area was outside the impact area of the design alternative.

4. WESTSIDE LOCAL TRAFFIC ANALYSIS

4.1 INTRODUCTION

This section compares existing and 2030 conditions at each of the four interchanges in the Westside portion of the SR 520 corridor (including I-5 interchanges at Mercer Street and Stewart Street), as well as affected intersections selected for analysis at this stage.

Alternatives evaluated at each Westside interchange include the following:

- Existing Conditions
- Year 2030 No Action Alternative
- Year 2030 Safety & Preservation (S&P) Alternative
- Year 2030 6-Lane Alternative (two GP lanes and one HOV lane in each direction on SR 520)
- Year 2030 8-Lane Alternative (three GP lanes and one HOV lane in each direction on SR 520)

Graphics illustrating the interchange configuration, analysis volumes, and analysis results for each alternative at all the Westside interchanges are contained in the Appendix. For purposes of the local traffic analysis, the No Action and S&P Alternatives are identical.

4.2 I-5/STEWART STREET INTERCHANGE

Two signalized intersections at the I-5/Stewart Street interchange were analyzed, with AM and PM peak hour LOS results summarized in Tables 18 and 19. The LOS results at these two intersections are briefly described below and summarized graphically in the Appendix in Figures 1a to 1h.

4.2.1 I-5/Stewart Street Interchange Adjacent Intersections

Two existing signalized intersections were analyzed at this interchange, the I-5 SB off-ramp intersection with John Street/Eastlake Avenue and Denny Way/Stewart Street. The City of Seattle uses signal timing at the intersection of the off-ramp with John Street/Eastlake Avenue to meter traffic entering downtown from the freeway during the morning peak period (by using an all-red phase equivalent to about 1/3 the signal's cycle length). The all-red phase provides a substantial capacity "reserve" that could be tapped if needed without widening the intersection, should it prove necessary. The intersection operates today at LOS C and LOS B in the AM and PM peak hours, respectively. The intersection of Denny Way/Stewart Street also operates at LOS B during the PM peak hour, and LOS D in the AM peak hour. Projected 2030 No Action conditions generate a slight increase in delay at Denny Way/Stewart Street, with no noticeable change at John Street/Eastlake Avenue.

Table 18. I-5/Stewart Street Interchange AM Peak Hour LOS Analysis Summary

Intersections	Existing		2030 No- Action		2030 6-Lane		2030 8-Lane	
	LOS	Delay (sec.)	LOS	Delay (sec.)	LOS	Delay (sec.)	LOS	Delay (sec.)
Denny Way/Stewart St.	D	37	D	45	D	37	D	49
John St./Eastlake Ave.	C	30	C	34	B	13	B	12

Table 19. I-5/Stewart Street Interchange PM Peak Hour LOS Analysis Summary

Intersections	Existing		2030 No- Action		2030 6-Lane		2030 8-Lane	
	LOS	Delay (sec.)	LOS	Delay (sec.)	LOS	Delay (sec.)	LOS	Delay (sec.)
Denny Way/Stewart St.	B	13	B	15	B	12	B	13
John St./Eastlake Ave.	B	11	B	11	B	11	B	12

2030 6-Lane Alternative

The 2030 6-Lane Alternative includes widening I-5 southbound to provide standard shoulder widths on the mainline and the Stewart Street off-ramp, which would also become slightly longer to provide standard deceleration length. With additional lanes on SR 520, peak hour traffic using the Stewart Street interchange increases.

Intersection Improvements

Modifying signal phasing at the Denny Way/Stewart Street intersection to provide protected/permissive left turn phasing for the westbound left turn on Denny Way is required to meet the PM peak hour No Action threshold. Providing protected/permissive left turn phasing across a roadway with two or more lanes of opposing traffic is a policy decision. Without protected/permissive phasing, the intersection would remain at LOS B in the PM peak hour, as under the No Action Alternative, but both the average delay and the volume-to-capacity ratio would increase compared to the No Action Alternative.

No intersection improvements or design modifications are needed to meet or exceed projected 2030 AM peak hour No Action conditions.

2030 8-Lane Alternative

The 2030 8-Lane Alternative includes the same modifications to Southbound I-5 as the 2030 6-Lane Alternative, and also generates higher traffic volumes at the intersections analyzed for the Stewart Street interchange.

Intersection Improvements

Revising signal timing to provide a protected/permissive westbound left turn on Denny Way at

the Denny Way/Stewart Street intersection during the PM peak hour satisfies the No Action LOS threshold. As with the 6-Lane Alternative, no additional improvements are needed to meet the No Action threshold for AM peak hour conditions, which are worse than PM peak hour.

4.3 I-5/MERCER STREET INTERCHANGE

Three signalized intersections were analyzed at the I-5/Mercer Street interchange, with AM and PM peak hour LOS results summarized in Tables 20 and 21. The results are briefly described below and summarized graphically in the Appendix in Figures 2a to 2h.

Table 20. I-5/Mercer Street Interchange AM Peak hour LOS Analysis Summary

	Existing		2030 No- Action		2030 6-Lane		2030 8-Lane	
Intersections	**LOS**	**Delay (sec.)**	**LOS**	**Delay (sec.)**	**LOS**	**Delay (sec.)**	**LOS**	**Delay (sec.)**
Mercer St./Fairview Ave./I-5 Ramps	F	109	F	93	E	64	E	70
Valley St./Fairview Ave. N	B	18	B	16	B	17	B	17
Fairview Ave. N/Eastlake Ave.	A	5	A	5	A	5	A	5

Table 21. I-5/Mercer Street Interchange PM Peak hour LOS Analysis Summary

	Existing		2030 No- Action		2030 6-Lane		2030 8-Lane	
Intersections	**LOS**	**Delay (sec.)**	**LOS**	**Delay (sec.)**	**LOS**	**Delay (sec.)**	**LOS**	**Delay (sec.)**
Mercer St./Fairview Ave./I-5 Ramps	F	175	F	180	F	152	F	154
Valley St./Fairview Ave. N	C	34	F	93	D	43	D	43
Fairview Ave. N/Eastlake Ave.	A	7	B	10	A	8	A	7

4.3.1 I-5/Mercer Street Interchange Adjacent Intersections

Three existing signalized intersections were analyzed at this interchange: the I-5 SB off-ramp intersection with Mercer Street/Fairview Avenue, Valley Street/Fairview Avenue, and Eastlake Avenue/Fairview Avenue. The I-5 off-ramp is a major portal into downtown Seattle; as Mercer Street is one-way eastbound, most of the I-5 traffic turns right, then left onto Valley Street one block to the north. The intersection operates today at LOS F during the AM and PM peak hours. Eastlake Avenue/Fairview Avenue operates at LOS A during both peak hours, and Valley Street/Fairview Avenue functions at LOS B in the morning peak hour and LOS C during the late afternoon peak. Under 2030 No Action, conditions the Valley Street/Fairview Avenue intersection worsens to LOS F in the PM peak hour, with peak hour volumes substantially higher than existing, but remains at LOS B during the morning peak hour. The LOS decrease is due to more traffic using Fairview Avenue under 2030 No Action conditions. In contrast, traffic exiting

the I-5 southbound off-ramp at Mercer Avenue is projected to decrease slightly under No Action conditions, largely due to upstream congestion on SR 520 acting to constrain through traffic flow.

2030 6-Lane Alternative

With the 2030 6-Lane Alternative, SR 520 would accommodate substantially more traffic in the peak AM westbound direction, much of it destined for downtown Seattle. To maintain intersection operations at or better than 2030 No Action Alternative conditions, intersection improvements are needed.

Intersection Improvements

The I-5 southbound off-ramp would require widening to provide a third westbound right turn lane onto Fairview Avenue. Even with an additional lane, the intersection operates at LOS F in the PM peak hour and LOS E during the morning peak hour. Installing signal interconnect for the signals at the I-5 southbound off-ramp and Valley Street/Fairview Avenue would allow the traffic signal at the Valley Street/Fairview Avenue intersection to be double-cycled, meaning the signal at Valley Street/Fairview Avenue would run through two full cycles for every single cycle at the I-5 southbound off-ramp. This allows the 2030 6-Lane Alternative to achieve the No Action LOS threshold with no additional capacity improvements, by increasing vehicle throughput at the Valley Street/Fairview Avenue intersection. No modifications are needed at Fairview Avenue/Eastlake Boulevard.

2030 8-Lane Alternative

Conditions with traffic from the 2030 8-Lane Alternative at the I-5 southbound off-ramp intersection are similar to the 2030 6-Lane Alternative.

Intersection Improvements

Mercer Avenue/I-5 Southbound off-ramp

- Add a third westbound right turn lane
- Interconnect traffic signals at the I-5 southbound off-ramp and the Valley Street/Fairview Avenue intersection to allow double cycling at Valley Street/Fairview Avenue.

4.4 SR 520/HARVARD AVENUE/ROANOKE STREET INTERCHANGE

Tables 22 and 23 summarize AM and PM peak hour LOS at the three signalized intersections selected for analysis at the Harvard Avenue/Roanoke Street interchange on SR 520. Following the tables, the LOS results at these two intersections are briefly described below. The LOS results at these three intersections are briefly described below and summarized graphically in the Appendix in Figures 3a to 3h.

Table 22. Harvard Ave./Roanoke St. Interchange AM Peak hour LOS Analysis Summary

Intersections	Existing		2030 No- Action		2030 6-Lane		2030 8-Lane	
	LOS	Delay (sec.)	LOS	Delay (sec.)	LOS	Delay (sec.)	LOS	Delay (sec.)
Roanoke St./10th Ave. E	B	13	B	11	A	6	A	9
Roanoke St./Harvard Ave./SR 520 WB Off Ramp	C	33	D	50	D	36	D	39
Roanoke St./Boylston Ave. E	C	21	C	21	C	21	B	17

Table 23. Harvard Ave./Roanoke St. Interchange PM Peak hour LOS Analysis Summary

Intersections	Existing		2030 No- Action		2030 6-Lane		2030 8-Lane	
	LOS	Delay (sec.)	LOS	Delay (sec.)	LOS	Delay (sec.)	LOS	Delay (sec.)
Roanoke St./10th Ave. E	B	14	B	14	A	9	A	9
Roanoke St./Harvard Ave./SR 520 WB Off Ramp	E	62	F	83	E	74	E	77
Roanoke St./Boylston Ave. E	C	24	B	19	B	18	B	19

4.4.1 SR 520 Harvard Ave./Roanoke St. Interchange Adjacent Intersections

Three existing signalized intersections were analyzed at this interchange: the SR 520 WB off-ramp intersection with Roanoke Street/Harvard Avenue, Roanoke Street/10th Avenue E, and Roanoke Street/Boylston Avenue E. This interchange provides a primary access to the University of Washington campus from SR 520. Under existing and 2030 No Action peak hour volumes, LOS D or better is provided except during the PM peak hour at SR 520 WB Off/Roanoke Street/Harvard Avenue. The ramp terminus operates today at LOS E during the PM peak hour, and would deteriorate to LOS F under No Action. In both cases the v/c ratio is high: 1.20 with existing PM peak hour traffic, and 1.38 with 2030 No Action volumes.

2030 6-Lane Alternative

Both 2030 Build Alternatives are anticipated to be similar to No Action, due to the University's intensive travel demand management (TDM) efforts, which are projected to limit future traffic increases to the University even with additional capacity on SR 520. The existing two-lane eastbound approach at the SR 520 Westbound off-ramp/Harvard Avenue/Roanoke Street intersection is a shared left-through lane and a second through lane that operates at LOS F in the PM peak hour with 2030 6-Lane Alternative volumes, which is worse than under the 2030 No Action Alternative. Roanoke Street/10th Avenue E also exceeds the 2030 No Action threshold. The Boylston Avenue E/Roanoke Street intersection operates at LOS B, the same as No Action, and does not require any further modifications or improvements.

Intersection Improvements

SR 520 WB Off/Harvard Avenue/Roanoke Street

- Restripe the eastbound approach to an exclusive left turn lane and one through lane to improve 2030 Build operations to LOS E in the PM peak hour.

Roanoke Street/10th Avenue E

- Restripe the westbound left-through lane to an exclusive left turn lane. Restripe the eastbound approach to an exclusive left turn lane and one through lane to improve 2030 Build operations to LOS A in the PM peak hour.

2030 8-Lane Alternative

The 2030 8-Lane Alternative results are nearly identical to the 2030 6-Lane Alternative.

Intersection Improvements

To meet the 2030 No Action threshold, the 2030 8-Lane Alternative requires the same restriping modifications as the 2030 6-Lane Alternative at the Roanoke Street/10th Avenue E and SR 520 WB Off/Roanoke Street/Harvard Avenue intersections.

4.5 SR 520/MONTLAKE BOULEVARD INTERCHANGE

Tables 24 and 25 summarize AM and PM peak hour LOS at a total of 14 existing intersections selected for analysis at the SR 520/Montlake Boulevard and the SR 520/Lake Washington Boulevard interchanges. Two new intersections created with the 8-Lane Alternative are also listed. Following the tables, the LOS results at the affected intersections are described. The LOS results at these 14 intersections are briefly described below and summarized graphically in the Appendix in Figures 4a to 4j, including the design option that would provide a second parallel bascule bridge on Montlake Boulevard across the Montlake Cut. Appendix Figures 5a to 5j show peak hour turn movements and LOS results for the SR 520/Lake Washington Boulevard Interchange.

Table 24. Montlake Interchange AM Peak hour LOS Analysis Summary

	Existing		2030 No- Action		2030 6-Lane		2030 6-Lane Parallel Bridge		2030 8-Lane	
Intersection	**LOS**	**Delay (sec.)**	**LOS**	**Delay (sec.)**	**LOS**	**Delay (sec.)**	**LOS**	**Delay (sec.)**	**LOS**	**Delay (sec.)**
Montlake Blvd./E Roanoke St.	A	9	B	13	B	14	B	13	B	19
Montlake Blvd. NE/SR 520 EB Ramps	F	123	F	169	E	75	F	138	F	143
Montlake Blvd./SR 520 WB Ramps	N/A	N/A	N/A	N/A	D	49	D	42	D	51
Montlake Blvd. NE/E Hamlin St.	B	13	C	31	A	7	A	3	A	7

Table 24 (cont'd). Montlake Interchange AM Peak hour LOS Analysis Summary

	Existing		2030 No- Action		2030 6-Lane		2030 6-Lane Parallel Bridge		2030 8-Lane	
Intersection	**LOS**	**Delay (sec.)**	**LOS**	**Delay (sec.)**	**LOS**	**Delay (sec.)**	**LOS**	**Delay (sec.)**	**LOS**	**Delay (sec.)**
Montlake Blvd. NE/E Shelby St.	C	26	E	73	D	42	B	15	D	46
Montlake Blvd. NE/NE Pacific St.	D	38	E	76	E	60	E	76	E	75
Below-Grade Tunnel Intersection									A	9
Montlake Blvd. NE/NE Pacific Pl.	B	13	C	22	B	17	C	26	C	25
Montlake Blvd. NE/25th Ave. NE	B	17	A	8	B	12	B	12	B	12
Montlake Blvd./Walla Walla Rd./NE 44th St.	A	10	A	5	A	5	A	9	A	8
Montlake Blvd./NE 45th St.	B	12	B	11	B	12	B	12	B	16
25th Ave. NE/Pend Oreille Rd./NE 44th St.	C	20	B	16	A	10	A	5	C	25
NE Pacific St./NE Pacific Pl.	D	43	D	42	A	9	A	7	A	7
NE Pacific St./15th Ave. NE	C	32	C	35	D	38	C	32	D	37
Lake Washington Blvd./SR 520 EB On/WB Off Ramp[1]	C	18	E	38	D	42	D	36	A	5
Pacific St. Extension/SR 520 WB Off-Ramp									A	6

1 Unsignalized for Existing and 2030 No Action scenarios and Signalized for 2030 6-Lane and 8-Lane Alternatives.

4.5.1 Montlake/Lake Washington Boulevard Interchange Adjacent Intersections

Twelve existing signalized intersections and two presently unsignalized intersections were analyzed at this interchange, including the single unsignalized intersection at the adjacent SR 520/Lake Washington Boulevard ramp. In addition, two design options were prepared for the 2030 6-Lane Alternative. One option includes a second bascule bridge parallel to and immediately east of the existing Montlake Bridge, which would remain. Each bridge would have three travel lanes, bicycle lanes and sidewalks. The third southbound lane would be restricted to HOV only. The other design option retains the existing configuration of the Montlake interchange and the Montlake Bridge, and does not affect any other adjacent intersections.

2030 6-Lane Alternative

The 2030 6-Lane Alternative includes a number of new left, through or right turn lanes throughout the Montlake Interchange area, in addition to a southbound HOV lane along Montlake Boulevard north of SR 520. However, traffic volumes along Montlake Boulevard increase with the 2030 6-Lane Alternative such that a number of intersection design enhancements are needed to match or exceed 2030 No Action operations, regardless of the

design option. Tables 24 and 25 reflect these additional measures, which are listed below.

Table 25. Montlake Interchange PM Peak hour LOS Analysis Summary

	Existing		2030 No-Action		2030 6-Lane		2030 6-Lane Parallel Bridge		2030 8-Lane	
Intersection	**LOS**	**Delay (sec.)**	**LOS**	**Delay (sec.)**	**LOS**	**Delay (sec.)**	**LOS**	**Delay (sec.)**	**LOS**	**Delay (sec.)**
Montlake Blvd./E Roanoke St.	A	7	A	9	B	11	B	11	B	11
Montlake Blvd. NE/SR 520 EB Ramps	F	98	F	119	E	75	E	75	F	98
Montlake Blvd./SR 520 WB Ramps	N/A	N/A	N/A	N/A	A	9	A	10	A	8
Montlake Blvd. NE/E Hamlin St.	A	10	B	14	B	12	A	2	B	12
Montlake Blvd. NE/E Shelby St.	C	33	F	86	E	62	E	64	B	18
Montlake Blvd. NE/NE Pacific St.	C	30	E	63	D	45	D	35	D	47
Below-Grade Tunnel Intersection									A	10
Montlake Blvd. NE/NE Pacific Pl.	E	78	F	107	E	55	E	70	F	83
Montlake Blvd. NE/25th Ave. NE	B	13	A	9	A	7	A	6	A	7
Montlake Blvd./Walla Walla Rd./NE 44th St.	A	7	B	13	B	12	B	13	A	6
Montlake Blvd./NE 45th St.	B	16	C	32	C	27	C	29	B	14
25th Ave. NE/Pend Oreille Rd./NE 44th St.	B	19	B	13	B	13	A	10	B	13
NE Pacific St./NE Pacific Pl.	D	40	C	25	B	12	B	12	B	13
NE Pacific St./15th Ave. NE	D	35	D	36	C	32	C	31	C	30
Lake Washington Blvd./SR 520 EB On/WB Off Ramps[1]	C	20	F	58	B	16	B	17	B	19
Pacific St. Extension/SR 520 WB Off-Ramp									D	38

1 Unsignalized for Existing and 2030 No Action scenarios and Signalized for 2030 6-Lane and 8-Lane Alternatives.

Intersection Improvements

Montlake Boulevard

- Extend the southbound HOV lane on Montlake Boulevard from NE Pacific Place through the intersection at E Shelby Street.
- Coordinated, optimized signal timing meets the No Action standard for the four northernmost intersections analyzed, beginning at Montlake Blvd. NE/25th Avenue NE.

NE Pacific Street

- Revise signal phasing at the NE Pacific Street/NE Pacific Place intersection.

- Widen the northbound through-right lane at the NE Pacific Street/15th Avenue NE intersection, to provide separate right turn and through lanes.

2030 6-Lane Alternative with Second Parallel Bridge Design Option

This design option provides a second bridge parallel to and immediately east of the existing Montlake Bridge. At Montlake Boulevard NE/NE Pacific Street, the southbound HOV queue jump lane also accommodates general purpose traffic turning right onto Pacific Street. The HOV lane continues south, terminating at the SR 520 westbound on-ramp, and at the Lake Washington Blvd./SR 520 EB on/WB off ramp intersection is signalized. As with the 2030 6-Lane Build Alternative that retains the existing Montlake Bridge, design enhancements are required along Montlake Boulevard and Pacific Street to meet the No Action threshold.

Intersection Improvements

Montlake Boulevard

- Extend the southbound HOV lane on Montlake Boulevard from NE Pacific Place through the intersection at E Shelby Street.

- Coordinated, optimized signal timing meets the No Action standard for the four northernmost intersections analyzed, beginning at Montlake Blvd. NE/25th Avenue NE.

NE Pacific Street

- Revise signal phasing at the NE Pacific Street/NE Pacific Place intersection.

- Widen the northbound through-right lane at the NE Pacific Street/15th Avenue NE intersection, to provide separate right turn and through lanes.

2030 8-Lane Alternative

The 2030 8-Lane Alternative does not change the existing Montlake Bridge, but provides major changes elsewhere in the Montlake area. Pacific Street extends east as a four-lane tunnel through the Husky stadium area parking area and underneath SR 520, reconnecting near the terminus of the existing SR 520/Lake Washington Boulevard ramps, which are reconstructed. Two of the four lanes are HOV lanes, which connect to the HOV facility in the SR 520 median with the 8-Lane Alternative, through a signalized underground intersection that reconnects to the rebuilt SR 520 just east of the existing Lake Washington Boulevard ramps. Lake Washington Boulevard is realigned south of SR 520, and signalized where it rejoins existing Lake Washington Boulevard.

Intersection Improvements

Additional lanes beyond what is shown in the design plans are needed to meet the No Action performance threshold.

Montlake Boulevard NE/NE Pacific Street

- Add a third southbound through lane that would merge shortly before reaching the Montlake Bridge. The lane would exist only to provide additional capacity through the intersection, and as such it would be likely to be used at a lower rate than the other two through lanes, as reflected in the analysis results.

- Provide a northbound right turn lane into the Husky stadium parking lot.

- Add a southbound right turn lane onto westbound NE Pacific Street.

- Add a third eastbound right turn lane to serve HOV traffic. The added southbound through lane would only need to continue through the intersection, merging before reaching the Montlake Bridge.

5. EASTSIDE LOCAL TRAFFIC ANALYSIS

5.1 INTRODUCTION

As with the Westside local traffic analysis, this section compares existing and 2030 conditions at each of the 10 interchanges in the Eastside portion of the SR 520 corridor, as well as additional affected intersections selected for analysis. The Eastside section runs from the Evergreen Point Floating Bridge east to the terminus of SR 520 at Union Hill Road.

As with the Westside segment, alternatives evaluated at each Eastside interchange include the following:

- Existing Conditions
- Year 2030 No Action Alternative
- Year 2030 Safety & Preservation (S&P) Alternative
- Year 2030 6-Lane Alternative (two GP lanes and one HOV lane in each direction on SR 520)
- Year 2030 8-Lane Alternative (three GP lanes and one HOV lane in each direction on SR 520)

Graphics illustrating the interchange configuration, analysis volumes, and analysis results for each alternative at all the Westside interchanges are contained in the Appendix. For purposes of the local traffic impact analysis, the No Action and S&P Alternatives are identical.

5.2 84th AVENUE NE/SR 520 INTERCHANGE

The existing and future analyses included two unsignalized intersections adjacent to the SR 520/84th Avenue NE interchange. The analysis results of the AM and PM peak hour LOS are summarized in Tables 26 and 27. The LOS results at these two intersections are briefly described below and summarized in Figures 6a to 6h in the Appendix.

Table 26. 84th Avenue NE Interchange AM Peak hour LOS Analysis Summary

	Existing		2030 No- Action		2030 6-Lane		2030 8-Lane	
Intersections	**LOS**	**Delay (sec.)**	**LOS**	**Delay (sec.)**	**LOS**	**Delay (sec.)**	**LOS**	**Delay (sec.)**
84th Avenue NE/ SR 520 WB on-ramp	B	11	B	11	B	11	B	11
84th Avenue NE/Hunts Point Circle	C	22	E	38	E	35	E	40

Table 27. 84th Avenue NE Interchange PM Peak hour LOS Analysis Summary

Intersections	Existing		2030 No- Action		2030 6-Lane		2030 8-Lane	
	LOS	Delay (sec.)	LOS	Delay (sec.)	LOS	Delay (sec.)	LOS	Delay (sec.)
84th Avenue NE/ SR 520 WB on-ramp	B	12	B	12	B	12	B	12
84th Avenue NE/Hunts Point Circle	D	33	E	43	E	43	E	43

5.2.1 84th Avenue NE /SR 520 Interchange Adjacent Intersections

The 84th Avenue NE/SR 520 WB on-ramp intersection is unsignalized. The SR 520 WB on-ramp has a metered GP lane and an HOV lane bypass of the ramp meter. WSDOT began ramp metering this intersection in late 2000. As a result, the amount of traffic entering SR 520 WB decreased from approximately 1,200 vehicles per hour (vph) to 600 vph during the AM and PM peak hours. This intersection operates at LOS C and LOS D in the AM and PM peak hours, respectively, with existing traffic. The 84th Avenue NE/SR 520 EB off-ramp intersection is also unsignalized today. The existing LOS at this intersection in the AM and PM are LOS C and LOS D, respectively.

Minor channelization improvements to eastbound NE 28th Street were made to all three 2030 alternatives because of a funded WSDOT/local agency project, which will remove on-street parking to provide a designated westbound right turn lane. Aside from that improvement, the 2030 No Action Alternative has the same intersection and lane geometry as the existing network. With 2030 No Action forecast volumes, the intersection of 84th Avenue NE/SR 520 WB on-ramp operates at LOS B in both the AM and PM peak hours. The 84th Avenue NE/SR 520 EB off-ramp (NE 28th Street) intersection operates at LOS E in both the AM and PM peak hours.

2030 6-Lane Alternative

The 2030 6-Lane Alternative has a modified configuration due to the reconstruction of SR 520. The freeway on-ramp length would be increased to meet design standards for a freeway on-ramp. The 84th Avenue NE/SR 520 WB on-ramp intersection would continue to operate at LOS B during both the AM and PM peak hours, despite the volume increase on SR 520 with the 6-Lane Alternative. The 84th Avenue NE/SR 520 EB off-ramp intersection would operate at LOS D during the AM and PM peak hours.

At the 84th Avenue NE/SR 520 EB Off-Ramp intersection (NE 28th Street), all the 2030 alternatives including 2030 No Action result in LOS E. Staff and elected officials from the Points communities (Clyde Hill, Medina, Hunt's Point, and Yarrow Point) have chosen to accept the future LOS E conditions rather than signalize the intersection.

2030 8-Lane Alternative

The 2030 8-Lane Alternative also has a modified configuration due to the reconstruction of SR 520. The freeway on-ramp length would be increased to meet design standards for a freeway on-ramp. The 84th Avenue NE/SR 520 WB on-ramp intersection would continue to operate at LOS B during both the AM and PM peak hours, despite the volume increase with the six-lane configuration on SR 520. The 84th Avenue NE/SR 520 EB off-ramp intersection would continue to operate at LOS E during the AM and PM peak hours.

As with the 6-Lane Alternative, signalizing the 84th Avenue NE/SR 520 EB Off-Ramp intersection (NE 28th Street) to improve the LOS E condition is not supported by the local agency and community. Staff and elected officials from the Points communities (Clyde Hill, Medina, Hunt's Point, and Yarrow Point) have chosen to accept the future LOS E conditions.

Intersection Improvements

Conditions with the 2030 Build Alternatives do not trigger the need for any other improvements or design modifications.

5.3 92nd AVENUE NE/SR 520 INTERCHANGE

The existing and all three 2030 analyses included two unsignalized intersections adjacent to the SR 520/92nd Avenue NE interchange. The AM and PM peak hour LOS analysis results are summarized in Tables 28 and 29. The LOS results at these two unsignalized intersections are briefly described below and summarized in Figures 7a to 7h in the Appendix.

Table 28. 92nd Avenue NE Interchange AM Peak hour LOS Analysis Summary

	Existing		2030 No- Action		2030 6-Lane		2030 8-Lane	
Intersections	**LOS**	**Delay (sec.)**	**LOS**	**Delay (sec.)**	**LOS**	**Delay (sec.)**	**LOS**	**Delay (sec.)**
Yarrow Point Road/ SR 520 WB Off-Ramp	C	19	F	56	F	186	F	150
92nd Avenue NE/ SR 520 EB on-ramp	A	6	A	3	A	4	A	5

5.3.1 92nd Avenue NE/SR 520 Interchange Adjacent Intersections

The Yarrow Point Road/SR 520 WB off-ramp intersection is stop-controlled for the SR 520 WB off-ramp. This intersection operates at LOS C in both the AM and PM peak hours. The primary movements at this intersection are along the north/south 92nd Avenue NE corridor. The existing 92nd Avenue/EB on-ramp intersection is unsignalized. Because the area south of this intersection is primarily residential, the half-diamond interchange to and from the east does not attract high traffic volumes, and the intersection operates at LOS A in both the AM and PM peak hours.

Table 29. 92nd Avenue NE Interchange PM Peak hour LOS Analysis Summary

	Existing		2030 No- Action		2030 6-Lane		2030 8-Lane	
Intersections	**LOS**	**Delay (sec.)**	**LOS**	**Delay (sec.)**	**LOS**	**Delay (sec.)**	**LOS**	**Delay (sec.)**
Yarrow Point Road/ SR 520 WB Off-Ramp	C	17	E	43	F	58	F	62
92nd Avenue NE/ SR 520 EB on-ramp	A	5	A	7	A	9	A	9

The 2030 No Action Alternative has the same lane configuration as the existing intersections. The 92nd Avenue/WB off-ramp intersection operates at LOS F and LOS E during the AM and PM peak hours, respectively, while the 92nd Avenue/EB on-ramp intersection operates at LOS A for both the AM and PM peak hours.

2030 6-Lane Alternative

The 2030 6-Lane Alternative also has the same lane configuration as the 2030 No Action intersections. The 92nd Avenue NE/SR 520 WB off-ramp intersection operates at LOS F in both the AM and PM peak hours, due to increases in ramp volume. The 92nd Avenue NE/ SR 520 EB on-ramp intersection operates at LOS A in both the AM and PM peak hours.

2030 8-Lane Alternative

The 2030 8-Lane Alternative has the same lane configuration and similar projected performance as the 2030 6-Lane and No Action intersections. The 92nd Avenue NE/SR 520 WB off-ramp intersection operates at LOS F in both the AM and PM peak hours due to increased ramp volumes. The 92nd Avenue NE/ SR 520 EB on-ramp intersection operates at LOS A in both the AM and PM peak hours.

Intersection Improvements

Conditions with the 2030 Build Alternatives at the 92nd Avenue NE/SR 520 WB Off-Ramp intersection also exceed the threshold established to identify the need for improvements or design modifications. However, the local agencies and community do not support signalizing the intersection to meet or exceed 2030 No Action conditions. Staff and elected officials from the Points communities (Clyde Hill, Medina, Hunt's Point, and Yarrow Point) have chosen to accept the future build LOS conditions.

5.4 BELLEVUE WAY/SR 520 INTERCHANGE

The existing and 2030 No Action analyses included two signalized intersections adjacent to the SR 520/Bellevue Way interchange. Both the 2030 6-Lane and 2030 8-Lane Alternatives would eliminate one existing intersection and add four new intersections. Tables 30 and 31 summarize

the AM and PM peak hour LOS analysis results, which are briefly described below and summarized in the Appendix in Figures 8a through 8h. Bellevue Way and Lake Washington Boulevard refer to the same north/south arterial roadway.

Table 30. Bellevue Way Interchange AM Peak hour LOS Analysis Summary

	Existing		2030 No- Action		2030 6-Lane		2030 8-Lane	
Intersections	**LOS**	**Delay (sec.)**	**LOS**	**Delay (sec.)**	**LOS**	**Delay (sec.)**	**LOS**	**Delay (sec.)**
Bellevue Way/NE 38th Place	B	11	B	16	A	9	B	15
Bellevue Way/Northup Way	C	26	C	26				
Bellevue Way/NE Points Drive					B	19	B	15
Bellevue Way/SR520 WB On/EB Off Ramps					C	32	C	24
Bellevue Way/SR 520 EB On/WB Off Ramps					B	15	B	13
Bellevue Way/NE 34th PL					B	11	A	5

= Not evaluated for this alternative due to roadway geometry modification.

Table 31. Bellevue Way Interchange PM Peak hour LOS Analysis Summary

	Existing		2030 No- Action		2030 6-Lane		2030 8-Lane	
Intersections	**LOS**	**Delay (sec.)**	**LOS**	**Delay (sec.)**	**LOS**	**Delay (sec.)**	**LOS**	**Delay (sec.)**
Bellevue Way/NE 38th Place	D	44	E	77	C	27	C	27
Bellevue Way/Northup Way	D	52	D	53				
Bellevue Way/NE Points Drive					E	57	C	32
Bellevue Way/SR520 WB On/EB Off Ramps					D	49	D	36
Bellevue Way/SR 520 EB On/WB Off Ramps					C	21	C	33
Bellevue Way/NE 34th PL					C	27	D	48

= Not evaluated for this alternative due to roadway geometry modification.

5.4.1 Bellevue Way/SR 520 Interchange Adjacent Intersections

At the Bellevue Way/SR 520 interchange, both the 2030 6-Lane and 8-Lane Alternatives combine a new full access interchange at Bellevue Way with removal of GP ramps and addition of HOV direct ramp access to and from the west at the 108th Avenue NE interchange.

There are two signalized intersections evaluated for the Bellevue Way Interchange. The signal at

the Lake Washington Boulevard/38th Place intersection is not coordinated with the adjacent Lake Washington Boulevard/Northup Way intersection to the south. This intersection acts as a meter for traffic entering and leaving the City of Kirkland. The highest volume movements at this intersection are the northbound and southbound through movements. PM peak hour left turn volumes are also relatively high in the westbound and southbound directions. These intersections operate at LOS D or better in the AM and PM peak hours.

All intersections operate at LOS D or better in the AM and PM peak hours, except the intersection of Bellevue Way/38th Place, which operates at LOS E in the 2030 PM peak hour, as shown above in Table 31.

2030 6-Lane Alternative

The 2030 6-Lane Alternative has major interchange improvements to provide more efficient design. The 108th Avenue interchange would be removed, and all movements would be provided at the Bellevue Way interchange. There are a total of five affected intersections, with one intersection remaining the same as existing and the remaining four re-designed to accommodate the new interchange. The intersection LOS results for this scenario in both the AM and PM peak hours are shown in Tables 30 and 31. Refer to Figure 8f in the Appendix for the schematic diagram of the new Bellevue Way interchange.

Intersection Improvements

The following 2030 6-Lane Alternative intersection design modifications satisfy the No Action LOS threshold and LOS D or better for new signalized intersections. Figure 8f in the Appendix also illustrates these design modifications.

Bellevue Way/NE 38th Place
- Add northbound through lane

Bellevue Way/NE Northup Way
- New signalized intersection

Bellevue Way/NE Points Drive
- New signalized intersection

Bellevue Way/SR 520 WB on-ramp/EB off-ramp
- New signalized intersection

Bellevue Way/ SR 520 EB on-ramp/WB off-ramp
- New signalized intersection

2030 8-Lane Alternative

The 2030 8-Lane Alternative has similar interchange adjacent intersections improvements as the 2030 6-Lane Alternative. LOS evaluated for this scenario in both the AM and PM peak hours are shown in Tables 30 and 31. Refer to Figure 8f for the schematic diagram of new Bellevue Way interchange.

Intersection Improvements

The following 2030 8-Lane Alternative intersection design modifications satisfy the No Action LOS threshold, and provide LOS D or better for new signalized intersections. Figure 8f in the Appendix also reflects these design modifications.

Bellevue Way/NE 38th Street
- Add northbound shared through/right lane

Bellevue Way/NE Northup Way
- New signalized intersection

Bellevue Way/NE Points Drive
- New signalized intersection

Bellevue Way/SR 520 WB on-ramp/EB off-ramp
- New signalized intersection

Bellevue Way/ SR 520 EB on-ramp/WB off-ramp
- New signalized intersection

5.5 108th AVENUE NE /SR 520 INTERCHANGE

For this interchange, both the 6-Lane and 8-Lane Alternatives include removal of the 108th Street interchange together with new HOV direct access ramps to and from the west.

The Existing and No Action analyses included two signalized intersections and one unsignalized intersection adjacent to the108th Avenue NE interchange. The volumes for the 2030 6-Lane and 8-Lane Alternatives at the 108th Avenue intersections were re-distributed to adjust for the new interchange on Bellevue Way. The AM and PM peak hour LOS analysis results are summarized in Tables 32 and 33. The LOS results at these intersections are briefly described below, with analysis volumes, interchange configuration and LOS results summarized graphically in Appendix Figures 8a to 8h, together with the SR 520/Bellevue Way interchange.

Table 32. 108th Avenue NE Interchange AM Peak hour LOS Analysis Summary

	Existing		2030 No- Action		2030 6-Lane		2030 8-Lane	
Intersections	**LOS**	**Delay (sec.)**	**LOS**	**Delay (sec.)**	**LOS**	**Delay (sec.)**	**LOS**	**Delay (sec.)**
108th Ave. NE/SR 520 EB On Ramp	B	11	D	29				
108th Ave. NE/ SR 520 WB Ramps	D	36	B	12				
108th Avenue NE/Northup Way	E	62	E	62	D	42	C	30
108th Ave. NE/HOV Direct Access Ramps					A	2	A	3
108th Ave. NE/NE 34th PL.					B	13	B	11

= Not evaluated for this alternative due roadway geometry modification.

Table 33. 108th Avenue NE Interchange PM Peak hour LOS Analysis Summary

	Existing		2030 No- Action		2030 6-Lane		2030 8-Lane	
Intersections	**LOS**	**Delay (sec.)**	**LOS**	**Delay (sec.)**	**LOS**	**Delay (sec.)**	**LOS**	**Delay (sec.)**
108th Ave. NE/SR 520 EB On Ramp	B	12	F	70				
108th Ave. NE/ SR 520 WB Ramps	C	35	B	19				
108th Avenue NE/Northup Way	E	62	F	87	D	39	E	63
108th Ave. NE/HOV Direct Access Ramps					A	2	A	3
108th Ave. NE/NE 34th PL.					C	22	C	22

= Not evaluated for this alternative due roadway geometry modification.

5.5.1 108th Avenue NE/SR 520 Interchange Adjacent Intersections

There are two signalized and one unsignalized intersections evaluated under this scenario. The existing signal at 108th Avenue/Northup Way is interconnected with the 108th Avenue/SR 520 WB on and off-ramp signal system. The signalized 108th Avenue/Northup Way intersection operates at LOS E in both the AM and PM peak hours. The signalized 108th Avenue/SR 520 WB on and off-ramp intersection operates at LOS D and C in the AM and PM peak hours, respectively, and the unsignalized 108th Avenue/SR 520 EB on-ramp intersection operates at LOS B in both the AM and PM peak hours.

The 2030 No Action Alternative has the same lane configuration as the existing intersections. With 2030 No Action peak hour forecast traffic volumes, the signalized 108th Avenue/Northup Way intersection operates at LOS E in the AM peak hour and LOS F in the PM peak hour. The signalized 108th Avenue/SR 520 WB on and off-ramp intersection operates at LOS B in both the

AM and PM peak hours, and the unsignalized of 108th Avenue/SR 520 EB on-ramp intersection operates at LOS D and LOS F in the AM and PM peak hours, respectively.

2030 6-Lane Alternative

The 2030 6-Lane Alternative has new HOV direct access ramps to and from the west to better serve the existing South Kirkland Park-and-Ride facility located just north of the 108th Avenue interchange. There is one existing signalized intersection located at 108th Avenue/Northup Way and two new signalized intersections to be located at the HOV direct access ramp intersections at 108th Avenue and 108th Avenue/NE 34th Place. Tables 32 and 33 show LOS results reflecting these new signals.

Intersection Improvements

The following signalized intersections would function at or better than the No Action LOS threshold (or LOS D or better for the new signalized intersections). Figure 8f in the Appendix reflects these design modifications.

108th Avenue NE/Northup Way

- Add eastbound left-turn lane
- Add westbound left-turn lane

108th Avenue NE/HOV direct ramps

- New signalized intersection

108th Avenue NE/NE 34th Place

- New signalized intersection

2030 8-Lane Alternative

The 2030 8-Lane Alternative has a similar interchange layout as 2030 6-Lane Alternative, with HOV direct access ramps.

Intersection Improvements

The following new signalized intersections with the 2030 8-Lane Alternative would operate at LOS D or better. Figure 8f in the Appendix reflects these design modifications.

108th Avenue NE/HOV direct ramps

- New signalized intersection

108th Avenue NE/NE 34th Place

- New signalized intersection

5.6 124th AVENUE NE/SR 520 INTERCHANGE

At this interchange, the 6-Lane and 8-Lane Alternatives have the same interchange configuration as No Action at 124th Ave NE for both SR 520 WB on and off-ramps. A full-diamond interchange to and from I-405 is added at Northup Way to replace the existing access between the 124th Avenue NE ramps and I-405. As a result, the existing 124th Avenue NE ramps would provide access to and from SR 520 only.

The 2030 No Action Alternative in this area included the following improvements from the Bellevue–Redmond Overlake Transportation Study (BROTs) project:

- BROTs Project 15.1 (124th Avenue NE/Northup Way Intersection at NE 20th Street): NB right turn lane; EB right turn and through lanes; conversion of WB right turn lane to WB shared right-through lane.

- BROTs Project 75.0 (Northup Way: 120th Avenue NE to 124th Avenue NE): Add a second EB through lane.

In addition, Bellevue has other TIP improvements planned for the Northup Way corridor between the intersections of Northup Way and NE 24th Street and Northup Way and 124th Avenue NE, including adding SR 520 ramps to and from the east at 124th Avenue NE or 130th Avenue NE. Another improvement planned by Bellevue is adding a left-turn lane from eastbound 124th Avenue NE to westbound SR 520. These planned improvements will be incorporated into an expanded local traffic impact analysis for the Trans-Lake Washington Project EIS.

The Existing and 2030 No Action analyses included five signalized intersections adjacent to the SR 520/124th Avenue NE interchange. The 2030 analysis for the 6-Lane and 8-Lane Alternatives includes the same number of intersections; however, the intersections reflect local circulation changes resulting from the new I-405/Northup Way interchange.

AM and PM peak hour LOS analysis results are summarized in Tables 34 and 35, and shown in Figures 9a through 9h in the Appendix.

5.6.1 124th Avenue NE/SR 520 Interchange Adjacent Intersections

The existing intersections are signalized and operate at LOS D or better in the AM and PM peak hours except the Northup Way/116th Avenue intersection, which operates at LOS E in the PM peak hour.

The 2030 No Action Alternative includes the same improvements from the Bellevue–Redmond Overlake Transportation Study (BROTs) project. With these improvements, the 2030 No Action intersections operate at LOS C or better in both the AM and PM peak hours except at the Northup Way/116th Avenue intersection that operates at LOS D in the PM peak hour.

Table 34. 124th Avenue NE Interchange AM Peak hour LOS Analysis Summary

	Existing		2030 No- Action		2030 6-Lane		2030 8-Lane	
Intersections	**LOS**	**Delay (sec.)**	**LOS**	**Delay (sec.)**	**LOS**	**Delay (sec.)**	**LOS**	**Delay (sec.)**
124th Ave. NE/Northup Way	C	31	C	24	C	24	C	24
120th Ave. NE/Northup Way	A	8	A	10	C	21	B	19
NE 24th St./Northup Way	A	9	B	12				
116th Ave. NE(north T)/Northup Way	D	44	B	19	D	45	D	41
116th Ave. NE(south T)/Northup Way	C	31	C	25				
I-405 NB On & Off Ramps/Northup Way					B	13	D	50
I-405 SB On & Off Ramps/Northup Way					C	27	C	27

= Not evaluated for this alternative due to roadway geometry modification.

Table 35. 124th Avenue NE Interchange PM Peak hour LOS Analysis Summary

	Existing		2030 No- Action		2030 6-Lane		2030 8-Lane	
Intersections	**LOS**	**Delay (sec.)**	**LOS**	**Delay (sec.)**	**LOS**	**Delay (sec.)**	**LOS**	**Delay (sec.)**
124th Ave. NE/Northup Way	D	48	C	34	C	31	D	36
120th Ave. NE/Northup Way	B	18	C	22	D	46	D	45
NE 24th St./Northup Way	B	17	C	34				
116th Ave. NE(north T)/Northup Way	E	63	C	35	D	54	D	54
116th Ave. NE(south T)/Northup Way	B	18	D	42				
I-405 NB On & Off Ramps/Northup Way					B	18	D	53
I-405 SB On & Off Ramps/Northup Way					D	54	D	38

= Not evaluated for this alternative due to roadway geometry modification.

2030 6-Lane Alternative

The 2030 6-Lane Alternative has numerous modifications along Northup Way compared to the No Action Alternative. These modifications include:

- The new I-405/Northup Way interchange NB and SB ramp termini intersections with Northup Way.
- The existing T-intersection of 115th Avenue NE realigns and connects to the existing 116th Avenue NE T-intersection to form a four-legged intersection. As a new intersection, a

threshold of LOS D applies, and is satisfied. No further improvement is needed.

- The NE 24th Street T-intersection realigns and connects to 120th Avenue NE to form a new four-legged intersection. With LOS D projected, no further improvement is needed.

Intersection Improvements

The following 2030 6-Lane Alternative intersection design modifications satisfy the No Action LOS threshold and provide LOS D or better for the new signalized intersections. Figure 9f in the Appendix reflects these design modifications.

124th Avenue NE/Northup Way
- Add northbound right-turn lane
- Add southbound right-turn lane

120th Avenue NE/Northup Way
- New signalized intersection

NE 24th Street/Northup Way
- New signalized intersection

116th Avenue (north T)/Northup Way
- New signalized intersection

I-405 NB Ramps/Northup Way
- New signalized intersection

I-405 SB Ramps/Northup Way
- New signalized intersection

2030 8-Lane Alternative

The 2030 8-Lane Alternative has the same intersections realignments as 2030 6-Lane Alternative; however, the intersection channelization improvements are different in some cases.

Intersection Improvements

The following intersection design modifications satisfy the No Action LOS threshold and LOS D or better for the new signalized intersections. Figure 9h in the Appendix reflects these design modifications.

124th Avenue NE/Northup Way

- Add northbound right-turn lane
- Add southbound left-turn lane
- Add southbound right-turn lane

120th Avenue NE/Northup Way
- New signalized intersection

NE 24th Street/Northup Way
- New signalized intersection

116th Avenue (north T)/Northup Way
- New signalized intersection

I-405 NB Ramps/Northup Way
- New signalized intersection

I-405 SB Ramps/Northup Way
- New signalized intersection

5.7 148th/SR 520 AVENUE NE INTERCHANGE

The existing and future analyses included three signalized intersections adjacent to the SR 520/148th Avenue NE interchange. The AM and PM peak hour LOS analysis results are summarized in Tables 36 and 37 and briefly described below. Figures 10a – 10h in the Appendix show the LOS results on diagrams of the interchange study area for the various alternatives.

Table 36. 148th Avenue NE Interchange AM Peak hour LOS Analysis Summary

	Existing		2030 No- Action		2030 6-Lane		2030 8-Lane	
Intersections	**LOS**	**Delay (sec.)**	**LOS**	**Delay (sec.)**	**LOS**	**Delay (sec.)**	**LOS**	**Delay (sec.)**
148th Ave. NE/NE 24th St.	E	59	E	80	F	126	E	77
148th Ave. NE/SR 520 EB Ramps	C	27	D	40	D	36	B	20
148th Ave. NE/SR 520 WB Ramps/NE 29th St.	C	30	C	32	D	39	D	39

Table 37. 148th Avenue NE Interchange PM Peak hour LOS Analysis Summary

	Existing		2030 No- Action		2030 6-Lane		2030 8-Lane	
Intersections	**LOS**	**Delay (sec.)**	**LOS**	**Delay (sec.)**	**LOS**	**Delay (sec.)**	**LOS**	**Delay (sec.)**
148th Ave. NE/NE 24th St.	F	94	F	123	F	130	F	96
148th Ave. NE/SR 520 EB Ramps	B	16	C	25	C	32	C	25
148th Ave. NE/SR 520 WB Ramps/NE 29th St.	E	57	F	94	E	59	E	57

5.7.1 148th Avenue NE/SR 520 Interchange Adjacent Intersections

The interchange is a partial cloverleaf design with two signalized intersections. The 148th Avenue NE/SR 520 WB on-ramp intersection operates at LOS C in the AM peak hour and LOS E in the PM peak hour. The 148th Avenue NE/SR 520 EB on and off-ramps intersection operates at LOS C and LOS B in the AM peak and PM peak hours, respectively. The 148th Avenue NE/NE 24th Street intersection located just south of the interchange operates today at LOS E and LOS F in the AM and PM peak hour, respectively.

The 2030 No Action Alternative includes modifications and improvements to the existing lane configurations. With these improvements, both intersections in the future No Action condition operate at LOS D or better in the AM peak hour. For the PM peak hour, the 148th Avenue NE/SR 520 EB on and off-ramps intersection operates at LOS C, and the 148th Avenue NE/SR 520 WB on-ramps intersection operates at LOS F. The 148th Avenue NE/NE 24th Street intersection continues to operate at LOS E and LOS F for the AM and PM peak hour, respectively. The 2030 No Action Alternative includes modifications near the 148th Avenue NE Interchange, including the BROTs projects summarized below.

- BROTs Project 25.2 (Intersection of 140th Avenue NE and NE 24th Street): Add second WB left turn lane from NE 24th Street to 140th Avenue NE.
- BROTs Project 28.0 (Intersection of 148th Avenue NE and NE 29th Place): Add southbound right turn lane on 148th Ave NE to NE 29th Pl; second westbound left turn lane from SR 520 off ramp to southbound 148th Ave; and convert eastbound right turn lane to shared left and right turn lane.
- BROTs Project 46.2 (NE 29th Place: 145th Avenue NE to NE 24th Street): Extend NE 29th Pl. between 148th Ave NE and NE 24th St.
- BROTs Project 49.0 (Intersection of 140th Avenue NE and NE 20th Street): Add second left-turn lanes both eastbound and westbound from NE 20th St to 140th Ave NE, and a southbound right-turn lane from 140th Ave NE to westbound NE 20th St.
- BROTs Project 50.1 (Intersection of 148th Avenue NE and NE 20th Street): Add second eastbound and westbound left turn lanes from NE 20th St to 148th Ave NE.
- BROTs Project 57.2 (NE 24th Street, SR520 to 140th Avenue NE): Widen NE 24th St to four lanes from 140th Ave NE to the proposed NE 29th Pl extension; provide two

westbound lanes, one eastbound lane and a two-way left turn lane.

- BROTs Project 68.0 (148th Avenue NE, SR 520 EB to northbound 148th off-ramp to 148th northbound to SR 520 WB on-ramp): Add northbound through lane; modify channelization and signals; SR-520 eastbound off-ramp to SR-520 westbound on-ramp.

2030 6-Lane Alternative

The 2030 6-Lane Alternative has the same lane configuration as the No Action condition for both of the ramp intersections. Both ramp intersections in the 2030 6-Lane Alternative meet the 2030 No Action threshold without any improvements. However, the 148th Avenue NE/NE 24th Street intersection experiences a substantial traffic increase with 2030 6-Lane Build volumes, with high-volume southbound left-turn and westbound right-turn movements.

Intersection Modifications

For the 2030 8-Lane Alternative, the following intersection modifications satisfy the No Action LOS threshold.

148th Avenue NE/NE 24th Street

- Provide southbound triple left turn lanes
- Provide a westbound free right turn lane

Further design work will be undertaken as part of the DEIS to ensure the recommended free right-turn lane can be accommodated on the downstream roadway sections with a dedicated receiving lane of an adequate length.

2030 8-Lane Alternative

The 2030 8-Lane Alternative requires substantial intersection improvements for all three study intersections in order to meet 2030 No Action LOS threshold. These intersection modifications are discussed below, and reflected in the LOS results shown above in Tables 36 and 37.

Intersection Modifications

For the 2030 8-Lane Alternative, the following intersection modifications satisfy the No Action LOS threshold.

148th Avenue NE/NE 24th Street

- Add eastbound right-turn lane
- Add westbound left-turn lane
- Add northbound through lane

148th Avenue NE/SR 520 EB Ramps

- Add westbound free right-turn lane
- Add northbound free right-turn lane

Further design work will be undertaken as part of the DEIS to ensure the recommended free right-turn lanes can be accommodated on the downstream roadway sections with a dedicated receiving lane of an adequate length.

148th Avenue NE/SR 520 WB Ramps/NE 29th Street

- Add westbound right-turn lane
- Add southbound right-turn lane

5.8 NE 40th/SR 520 STREET INTERCHANGE

This new interchange was constructed in 2000. The new interchange includes a collector-distributor system connecting NE 40th Street and the NE 51st Street interchanges in both the eastbound and westbound directions of SR 520. The 8-Lane Alternative includes reconstruction of the NE 40th Street and NE 51st Street interchanges as braided ramps, with removal of the existing collector-distributor lanes that connects the two interchanges.

The existing and future analyses included three signalized intersections adjacent to the SR 520/NE 40th Street interchange. Tables 38 and 39 summarize the AM and PM peak hour LOS analysis results, and Figures 11a – 11h show diagrams of the combined NE 40th Street/NE 51st Street interchange study area for the various alternatives. The LOS results at the three intersections for the NE 40th Street portion of the interchange are briefly described below.

There are a number of improvement projects from the Bellevue–Redmond Overlake Transportation Study (BROTs) proposed to be fully funded that are in the vicinity of the NE 40th Street Interchange, but do not directly affect the intersections studied in this report.

Table 38. NE 40th Street Interchange AM Peak hour LOS Analysis Summary

	Existing		2030 No- Action		2030 6-Lane		2030 8-Lane	
Intersections	**LOS**	**Delay (sec.)**	**LOS**	**Delay (sec.)**	**LOS**	**Delay (sec.)**	**LOS**	**Delay (sec.)**
NE 40th Street/SR 520 WB Ramps	C	24	C	26	C	31	C	23
NE 40th Street/SR 520 EB Ramps	B	14	D	50	D	38	D	37
NE 40th Street/156th Avenue NE	D	43	F	134	F	110	F	129

Table 39. NE 40th Street Interchange PM Peak hour LOS Analysis Summary

Intersections	Existing		2030 No- Action		2030 6-Lane		2030 8-Lane	
	LOS	Delay (sec.)	LOS	Delay (sec.)	LOS	Delay (sec.)	LOS	Delay (sec.)
NE 40th Street/SR 520 WB Ramps	B	19	C	25	B	19	C	31
NE 40th Street/SR 520 EB Ramps	B	20	B	14	B	11	B	18
NE 40th Street/156th Avenue NE	D	54	F	123	E	67	E	71

These improvements will be incorporated in the No Action and Build Alternatives if any of these intersections are included in subsequent analyses for the Trans-Lake Washington Project EIS. BROTs projects and locations include:

- BROTs Project 4.1 (Intersection of 159th Avenue NE and NE 40th Street): Revise lanes to provide northbound left turn and shared northbound left turn/right turn lanes.
- BROTs Project 8.1 (Intersection of 150th Avenue NE and NE 40th Street): Add northbound right turn lane.
- BROTs Project 27.0 (Intersection of 148th Avenue NE and NE 40th Street): Add 2nd southbound left turn and northbound right turn lanes.
- BROTs Project 27.1 (Intersection of 148th Avenue NE and NE 40th Street): Add second westbound right turn lane.
- BROTs Project 81 (Intersection of 156th Avenue NE and NE 36th Street): Add eastbound right turn and a second westbound right turn lane. This project has been completed.

The existing interchange has two signalized intersections. The NE 40th Street interchange is a conventional diamond interchange with an eight-lane cross section. Back-to-back dual left turn lanes are provided between the two SR 520 intersections on NE 40th Street. Both intersections operate at LOS C or better in both the AM and PM peak hours with existing traffic.

Based on field observations, the eastbound right turn movement, which represents more than half the volume on this ramp during both the AM and PM peak hours, has a lower efficiency than shown in the traffic analysis results due to the interchange configuration. An uphill grade combined with the wide pedestrian crossing, barrier, and railing reduces sight distance for this movement. For these reasons, right turns on red are prohibited, which decreases the right turn capacity and creates longer queues on the ramp. The NE 40th Street/156th Avenue NE intersection is signalized, and operates at LOS D in both the AM and PM peak hours.

The 2030 No Action Alternative has the same lane configuration as the existing intersections. The NE 40th Street/SR 520 WB ramps and NE 40th Street/SR 520 EB ramps intersections operate at LOS D or better for both of the AM and PM peak hours. The NE 40th Street/156th Avenue NE intersection operates at LOS F in both the AM and PM peak hours due to an increase in volume compared to existing conditions.

2030 6-Lane Alternative

The 2030 6-Lane Alternative meets the No Action LOS threshold with a modified lane configuration. With modifications, the intersections improve to LOS C or better except, for during AM peak at the NE 40th Street/SR520 EB ramps intersection, which operates at LOS D in No Action and 2030 6-Lane Alternatives. The NE 40th Street/156th Avenue NE intersection also requires modification to satisfy the 2030 No Action LOS threshold. Without improvement, this intersection operates at LOS F in both the AM and PM peak hours.

Intersection Improvements

The following intersection design modifications are needed to satisfy the No Action LOS threshold.

NE 40th Street /SR 520 EB Ramps

- Add northbound left-turn lane
- Add eastbound through lane
- Add northbound free right-turn lane

Further design work will be undertaken as part of the DEIS to ensure the recommended free right-turn lane can be accommodated on the downstream roadway section with a dedicated receiving lane of an adequate length.

NE 40th Street /156th Avenue NE

- Add northbound left-turn lane
- Add southbound left-turn lane
- Add eastbound free right-turn lane

Further design work will be undertaken as part of the DEIS to ensure the recommended free right-turn lane can be accommodated on the downstream roadway section with a dedicated receiving lane of an adequate length.

2030 8-Lane Alternative

The 2030 8-Lane Alternative also requires modified lane configurations to meet the No Action LOS threshold. With modifications, operations improve to LOS D or better for both the AM and PM peak hours at the NE 40th Street/SR 520 WB ramps and NE 40th Street/SR 520 EB ramps intersections. The NE 40th Street/156 Avenue NE intersection continues to operate at LOS F, the same as the No Action Alternative.

Intersection Improvements

The following intersection design modifications are needed to satisfy the No Action LOS

threshold.

NE 40th Street/SR 520 WB Ramps

- Add southbound left-turn lane

NE 40th Street /SR 520 EB Ramps

- Add eastbound through lane
- Add northbound free right-turn lane

NE 40th Street /156th Avenue NE

- Add northbound right-turn lane
- Add southbound right-turn lane
- Add eastbound free right-turn lane
- Add westbound right-turn lane

Further design work will be undertaken as part of the DEIS to ensure the recommended free right-turn lanes can be accommodated on the downstream roadway section with dedicated receiving lanes of adequate length.

5.9 NE 51st/SR 520 STREET INTERCHANGE

The NE 40th Street and NE 51st Street interchanges are reconstructed in the 8-Lane Alternative as braided ramps, removing the existing collector-distributor lanes that connect the two interchanges.

The existing and future 2030 analyses include two intersections adjacent to the SR 520/NE 51st Street interchange. AM and PM peak hour LOS analysis results are summarized in Tables 40 and 41. Figures 11a – 11h show the analysis volumes and LOS results on diagrams of the interchange study area for the various alternatives for the combined NE 40th Street/NE 51st Street interchanges. The LOS results at the two intersections analyzed at the NE 51st Street portion of the interchange are briefly described below.

The BROTs projects listed below are proposed to be fully funded and are in the vicinity of the 51st Street Interchange, but do not directly affect the intersections studied in this report. These improvements will be incorporated in the 2030 No Action and Build Alternatives if these other intersections are included in subsequent analyses for the Trans-Lake Washington Project EIS.

Table 40. NE 51st Street Interchange AM Peak hour LOS Analysis Summary

Intersections	Existing		2030 No- Action		2030 6-Lane		2030 8-Lane	
	LOS	Delay (sec.)	LOS	Delay (sec.)	LOS	Delay (sec.)	LOS	Delay (sec.)
NE 51st Street/SR 520 WB Ramps	B	11	B	16	C	22	B	14
NE 51st Street/SR 520 EB Ramps	B	12	B	15	C	27	B	18

Table 41. NE 51st Street Interchange PM Peak hour LOS Analysis Summary

Intersections	Existing		2030 No- Action		2030 6-Lane		2030 8-Lane	
	LOS	Delay (sec.)	LOS	Delay (sec.)	LOS	Delay (sec.)	LOS	Delay (sec.)
NE 51st Street/SR 520 WB Ramps	A	7	A	5	A	8	A	9
NE 51st Street/SR 520 EB Ramps	B	16	C	28	C	20	C	22

- BROTs Project 29.0 (Intersection of 148th Avenue NE and NE 51st Street): Add 2nd southbound left turn lane; convert westbound lanes to provide shared left turn/through and two right turn lanes. This project has been completed, with westbound channelization revised to left, left/through, and right turn lanes.
- BROTs Project 32.0 (Intersection of 148th Avenue NE and NE 56th Street): Add northbound right turn lane. This project is also complete.
- BROTs Project 85.0 (Intersection of 150th Avenue NE and NE 51st Street): Add north leg to intersection, provide two southbound left turn lanes, and signalize.

5.9.1 NE 51st Street/SR 520 Interchange Adjacent Intersections

The existing interchange has two signalized intersections. This interchange has a five-lane cross-section with aligned left-turn movements. This design provides less capacity than the NE 40th Street interchange but traffic volumes have also decreased at this interchange since the new NE 40th Street interchange was constructed. Both intersections operate at LOS B or better under existing AM and PM peak hour traffic volumes.

The 2030 No Action Alternative has the same lane configuration as the existing interchange. The intersections operate at LOS C or better for both the AM and PM peak hours.

2030 6-Lane Alternative

The 2030 6-Lane Alternative has the same lane configuration as the existing interchange. Similarly, the intersections operate at LOS C or better for both the AM and PM peak hours.

Intersection Improvements

The following intersection design modifications are needed to satisfy the No Action LOS threshold, and are reflected in the table above.

NE 51st Street/SR 520 WB Ramps
- Add southbound free right-turn lane

NE 51st Street/SR 520 EB Ramps
- Add northbound left-turn lane

Further design work will be undertaken as part of the DEIS to ensure the recommended free right-turn lane can be accommodated on the downstream roadway section with a dedicated receiving lane of adequate length.

2030 8-Lane Alternative

With the 2030 8-Lane Alternative, no additional improvements would be necessary, as LOS values would be identical to the 2030 No Action Alternative, and average intersection delays would be within the 5-second tolerance threshold.

Intersection Improvements

No intersection improvements are needed for this scenario.

5.10 WEST LAKE SAMMAMISH PARKWAY/SR 520 INTERCHANGE

The existing and future analyses include four signalized intersections and one unsignalized intersection adjacent to the SR 520/West Lake Sammamish interchange. Tables 42 and 43 summarize the AM and PM peak hour LOS analysis results, which are also shown in the Appendix in Figures 12a – 12h, which show the LOS results on diagrams of the interchange study area for the various alternatives.

The 2030 No Action Alternative has a significantly modified lane configuration from the existing interchange. While the existing conditions analysis reflects lane geometry in place at the time the traffic counts were conducted, the City of Redmond recently completed improvements to the West Lake Sammamish Corridor based on recommendations from the Bellevue-Redmond Overlake Transportation Study (BROTs). This particular project (BROTs Project 86.0 – Intersection of West Lake Sammamish Parkway NE and Leary Way) modified channelization on Leary Way to provide two left turn lanes, and added a southbound lane on West Lake Sammamish Parkway from Old Redmond Road to Marymoor Park.

5.10.1 West Lake Sammamish Parkway/SR 520 Interchange Adjacent Intersections

The existing interchange has four signalized intersections and one unsignalized intersection. Improvements in the West Lake Sammamish corridor were completed in 2002; however, to be consistent with the traffic counts used in the analysis, the existing conditions and geometric configuration are based on pre-construction conditions. The existing intersections operate at LOS D or better except at the intersection of West Lake Sammamish Parkway/EB Ramps, which operates at LOS F.

Table 42. West Lake Sammamish Parkway Interchange AM Peak hour LOS Analysis Summary

	Existing		2030 No- Action		2030 6-Lane		2030 8-Lane	
Intersections	**LOS**	**Delay (sec.)**	**LOS**	**Delay (sec.)**	**LOS**	**Delay (sec.)**	**LOS**	**Delay (sec.)**
SR 520 EB Ramps/ W Lake Sammamish Pkwy.	F	126	F	150	F	150	F	190
SR 520 WB Ramps/ W Lake Sammamish Pkwy./Leary Way NE	C	24	F	94	F	91	F	92
159th PL. NE/NE Leary Way	A	6	B	15	A	5	A	9
Bear Ck. Pkwy/NE Leary Way	A	6	A	9	B	16	B	18
Bear Ck. Pkwy/NE 74th St.[1]	B	11	B	11	B	11	B	17

1 Unsignalized for Existing and 2030 No Action scenarios and Signalized for 2030 6-Lane and 8-Lane Alternatives.

Table 43. West Lake Sammamish Parkway Interchange PM Peak hour LOS Analysis Summary

	Existing		2030 No- Action		2030 6-Lane		2030 8-Lane	
Intersections	**LOS**	**Delay (sec.)**	**LOS**	**Delay (sec.)**	**LOS**	**Delay (sec.)**	**LOS**	**Delay (sec.)**
SR 520 EB Ramps/ W Lake Sammamish Pkwy.	F	155	F	220	F	214	F	213
SR 520 EB Ramps/ W Lake Sammamish Pkwy./Leary Way NE	C	31	F	197	F	212	F	221
159th PL. NE/NE Leary Way	C	23	F	220	F	123	F	109
Bear Creek. Pkwy/NE Leary Way	B	11	F	127	F	148	F	147
Bear Creek. Pkwy/NE 74th St.[1]	D	26	F	>300	D	38	C	26

1 Unsignalized for Existing and 2030 No Action scenarios and Signalized for 2030 6-Lane and 8-Lane Alternatives.

With improvements added to the 2030 No Action, including those recently completed, the intersections at NE Leary Way/159th Place NE, NE Leary Way/Bear Creek Parkway, and Bear Creek Parkway/NE 74th Street operate at LOS B or better in the AM peak hour. However, the remaining intersections in both AM and PM peak hours operate at LOS F.

2030 6-Lane Alternative

The 2030 6-Lane Alternative requires capacity improvements in order to bring intersections back to 2030 No Action LOS threshold. Needed capacity improvements are due to significant ramp volume increases at both the SR 520 EB and WB ramps. The results of these design modifications are reflected in Tables 42 and 43 above.

Intersection Improvements

The following design modifications are needed to satisfy the No Action LOS threshold.

SR 520 WB Ramps/West Lake Sammamish Parkway/Leary Way NE
- Add southbound left-turn pocket

159th Place NE/NE Leary Way
- Add southbound left-turn pocket
- Add eastbound through lane
- Add westbound through lane

Bear Creek Parkway/NE Leary Way
- Add westbound free right-turn pocket
- Add westbound through lane

Further design work will be undertaken as part of the DEIS to ensure the recommended free right-turn lane can be accommodated on the downstream roadway section with a dedicated receiving lane of an adequate length.

Bear Creek Parkway/NE 74th Street
- Install new signal

2030 8-Lane Alternative

The 2030 8-Lane Alternative also requires capacity improvements in order to bring intersections back to 2030 No Action LOS threshold, due to ramp volume increases at both the SR 520 EB and WB ramps. Results with these additional intersection improvements are reflected in Tables 42 and 43.

Intersection Improvements

The following design modifications are needed to satisfy the No Action LOS threshold.

SR 520 EB Ramps/West Lake Sammamish Parkway

- A direct fly-over ramp is recommended to serve the high-volume eastbound-to-northbound left-turn and achieve the 2030 No Action Alternative level of delay

SR 520 WB Ramps/West Lake Sammamish Parkway/Leary Way NE

- Add southbound left-turn pocket

159th Place NE/NE Leary Way

- Add southbound left-turn pocket
- Add eastbound through lane
- Add westbound through lane

Bear Creek Parkway/NE Leary Way

- Add westbound through lane

Bear Creek Parkway/NE 74th Street

- Install new signal

5.11 REDMOND WAY (SR 202)/SR 520 INTERCHANGE

Both the 2030 6-Lane Alternative and 2030 8-Lane Alternative include two GP lanes and one HOV lane in each direction from West Lake Sammamish Parkway to Union Hill Road, including SR 520 through the Redmond Way (SR 202)/SR 520 interchange. The existing and future No Action analyses included four signalized and two unsignalized intersections adjacent to the SR 520/Redmond Way (SR 202) interchange; for the 2030 Build Alternatives, all six intersections are signalized. The AM and PM peak hour LOS analysis results at these six intersections are listed in Tables 44 and 45, and shown graphically in Figures 13a to 13h in the Appendix.

5.11.1 Redmond Way/SR 520 Interchange Adjacent Intersections

The existing interchange has four signalized and two unsignalized adjacent intersections. The unsignalized intersections are located along NE 76th Street at the eastbound on-ramp terminus and westbound off-ramp terminus, and operate today at LOS B or better in the AM and PM peak hours, except at the NE 76th Street/WB off-ramp intersection, which operates at LOS D in the PM peak hour. The signalized intersections along Redmond way are mostly operating at LOS D or better in both the AM and PM peak hours. Two signalized intersections operate below LOS D. The Redmond Way/East Lake Sammamish Parkway intersection operates at LOS F in the AM peak hour, and the Redmond Way/WB on-ramp intersection operates at LOS E in the PM peak hour due to the high volume westbound left-turn movement.

Table 44. Redmond Way Interchange AM Peak hour LOS Analysis Summary

	Existing		2030 No- Action		2030 6-Lane		2030 8-Lane	
Intersections	**LOS**	**Delay (sec.)**	**LOS**	**Delay (sec.)**	**LOS**	**Delay (sec.)**	**LOS**	**Delay (sec.)**
Redmond Way/SR 520 WB On	D	37	C	24	B	16	B	14
Redmond Way/SR 520 EB Off	C	21	C	31	B	16	B	19
NE 76th St./SR 520 WB Off[1]	B	12	C	16	B	18	C	23
NE 76th St./SR 520 EB On[1]	A	8	A	9	A	9	A	9
Redmond Way/NE 70th St.	C	23	B	11	C	21	B	11
E Lake Sammamish/180th Ave /Redmond Way	F	107	D	42	D	46	E	67

1 Unsignalized for Existing and 2030 No Action scenarios and Signalized for 2030 6-Lane and 8-Lane Alternatives.

The 2030 No Action geometry remained unchanged for most intersections except a planned improvement included in the analysis at the Redmond Way/EB off-ramp intersection. The LOS for the 2030 AM peak hour are all LOS D or better. The operation results for the 2030 PM peak hour are worse than the 2030 AM peak hour, with all intersections operating at LOS D or worse, except at the NE 76th Street/EB on-ramp intersection which operates at LOS A.

Table 45. Redmond Way Interchange PM Peak hour LOS Analysis Summary

	Existing		2030 No- Action		2030 6-Lane		2030 8-Lane	
Intersections	**LOS**	**Delay (sec.)**	**LOS**	**Delay (sec.)**	**LOS**	**Delay (sec.)**	**LOS**	**Delay (sec.)**
Redmond Way/SR 520 WB On	E	74	E	65	D	51	E	56
Redmond Way/SR 520 EB Off	D	38	D	44	F	104	F[2]	133[2]
NE 76th St./SR 520 WB Off[1]	D	31	E	45	B	16	B	18
NE 76th St./SR 520 EB On[1]	A	3	A	3	A	3	A	3
Redmond Way/NE 70th St.	D	37	E	77	E	72	E	80
E Lake Sammamish/180th Ave /Redmond Way	D	46	D	43	D	40	D	49

1 Unsignalized for Existing and 2030 No Action scenarios and Signalized for 2030 6-Lane and 8-Lane Alternatives.

2 Potential improvements to achieve 2030 NA LOS or better were not identified for this location. Evaluation of improvement threshold as well as additional evaluation of potential improvements and strategies for this location will be conducted as part of the DEIS.

2030 6-Lane Alternative

The 2030 6-Lane Alternative design includes the following improvements, which are reflected both in the LOS tables and the figures in the Appendix summarizing intersection LOS analysis:

- A new direct fly-over ramp off eastbound Redmond Way to alleviate a high-volume left-turn movement at the SR 520 westbound on-ramp.
- A new signal at the NE 76th Street/WB off-ramp.

Intersection Improvements

The following additional design modifications are needed to meet or exceed 2030 No Action conditions.

Redmond Way/SR 520 WB On
- Add a westbound right-turn lane

Redmond Way/SR 520 EB Off
- Add northbound left-turn lane

NE 76th St./SR 520 EB On
- Northbound through lane
- Southbound right-turn lane
- Eastbound left-turn lane

Redmond Way/NE 70th Street
- Northbound through lane
- Southbound through lane
- Southbound right-turn lane

Redmond Way/E Lake Sammamish Parkway
- Northbound left-turn lane
- Eastbound through-lane
- Eastbound free right-turn lane
- Westbound through lane

Further design work will be undertaken as part of the DEIS to ensure the recommended free right-turn lane can be accommodated on the downstream roadway section with a dedicated receiving lane of an adequate length.

2030 8-Lane Alternative

The 2030 8-Lane Alternative design includes the following improvements, which are the same as the 6-Lane Alternative:

- A new direct fly-over ramp off eastbound Redmond Way to alleviate a high-volume left-turn movement at the SR 520 westbound on-ramp.
- A new signal at the NE 76th Street/WB off-ramp.

The LOS results shown in Tables 44 and 45 above reflect these additional design measures, as do Appendix Figures 13a through 13f.

Intersection Improvements

The following additional design modifications are needed to satisfy the No Action LOS threshold. However, acceptable improvements could not be identified to return the 2030 PM peak hour LOS at the Redmond Way/SR 520 EB off-ramp intersection to equal or better than 2030 No Action LOS D conditions. LOS F is expected with 2030 8-Lane Alternative PM peak hour traffic.

Redmond Way/SR 520 WB On
- Add southbound left-turn lane

Redmond Way/SR 520 EB Off
- Free northbound right-turn lane (a 2nd free right-turn lane is needed in order to improve the intersection to equal or better than the 2030 No Action LOS.)

NE 76th St./SR 520 WB Off
- Add a westbound left-turn lane

Redmond Way/NE 70th Street
- Add an eastbound left-turn lane
- Add a northbound through lane
- Add a southbound through lane

E Lake Sammamish/180th Ave /Redmond Way
- Add a northbound left-turn lane
- Add a eastbound through lane
- Add a free eastbound right-turn lane

- Add a westbound through lane
- Add a westbound right-turn lane

Further design work will be undertaken as part of the DEIS to ensure the recommended free right-turn lanes can be accommodated on the downstream roadway section with dedicated receiving lanes of an adequate length.

Additional work will also be needed as part of the DEIS to identify potential improvement alternatives for the Redmond Way/SR 520 EB off-ramp intersection.

5.12 AVONDALE WAY/SR 520 INTERCHANGE

Both the 2030 6-Lane Alternative and 2030 8-Lane Alternative include two GP lanes and one HOV lane in each direction from West Lake Sammamish Parkway to Union Hill Road, including SR 520 at the Avondale Way/SR 520 interchange.

5.12.1 Avondale Way/SR 520 Interchange Adjacent Intersections

There are three signalized intersections adjacent to the interchange. The Union Hill Road/ Avondale Road Extension intersection is the terminus of the SR 520 freeway, which today has a single lane in each direction in the terminal segment. In the westbound direction, SR 520 has two lanes that reduce to a single lane over the SR 202 bridge structure. This intersection operates today at LOS D in the AM peak hour and LOS F in the PM peak hour. Intersections at Avondale Road/Avondale Road Extension and Avondale Road/Union Hill Road operate at LOS D or better in both the AM and PM peak hours.

The 2030 No Action Alternative includes improvements to the ramp terminus intersection at NE Union Hill Road/Avondale Extension, as well as along NE Union Hill Road. This project modified channelization and added capacity to the corridor. The improvements are listed below:

- An additional southbound left turn lane on Avondale Extension.
- An exclusive northbound 100-foot right turn pocket on SR 520 connecting to a new eastbound right-turn lane on Union Hill Road between SR 520 and 178th Place NE.
- An exclusive eastbound 80-foot right turn pocket on Union Hill Road.
- An additional westbound left turn lane and a 300-foot westbound right turn pocket on Union Hill Road.

The improvements listed primarily improve the PM LOS of this intersection. The No Action Alternative operates at LOS E in the AM peak hour and LOS F in the PM peak hour.

The existing and future analyses included three signalized intersections adjacent to the SR 520/Avondale Way interchange. Tables 46 and 47 summarize the LOS analysis results for the AM and PM peak hour, while Figures 14a – 14h in the Appendix show the LOS results on diagrams of the interchange study area for the various alternatives.

Table 46. Avondale Way Interchange AM Peak hour LOS Analysis Summary

Intersections	Existing		2030 No- Action		2030 6-Lane		2030 8-Lane	
	LOS	Delay (sec.)	LOS	Delay (sec.)	LOS	Delay (sec.)	LOS	Delay (sec.)
Avondale Rd. NE/NE Union Hill Rd.	A	9	A	10	A	9	B	12
Union Hill Rd./Avondale Extension (SR 520 Terminus)	D	49	E	66	F	90	E	69
Avondale 520 Extension/Avondale Rd.	A	4	A	5	A	4	A	9

2030 6-Lane Alternative

With a 40-percent increase in SR 520 eastbound off-ramp volumes, the 2030 6-Lane Alternative requires capacity improvements at the intersections of Union Hill Road/Avondale Road Extension and Avondale Road Extension/Avondale Road to meet the 2030 No Action LOS threshold. Tables 46 and 47 summarize LOS results reflecting these additional capacity improvements, which are listed below.

Table 47. Avondale Way Interchange PM Peak hour LOS Analysis Summary

Intersections	Existing		2030 No- Action		2030 6-Lane		2030 8-Lane	
	LOS	Delay (sec.)	LOS	Delay (sec.)	LOS	Delay (sec.)	LOS	Delay (sec.)
Avondale Rd. NE/NE Union Hill Rd.	D	42	D	41	C	24	C	25
Union Hill Rd./Avondale Extension (SR 520 Terminus)	F	112	F	104	E	71	F	114
Avondale 520 Extension/Avondale Rd.	C	22	E	74	E	58	F	85

Intersection Improvements

The following design modifications are needed to satisfy the No Action LOS threshold.

Union Hill Road/Avondale Road Extension

- Add northbound through lane
- Add southbound through lane

Avondale Road Extension/Avondale Road

- Add northbound right-turn lane
- Add westbound left-turn lane

However, the additional westbound left turn lane would be the third left turn lane, and could not be provided unless the SR 520 WB on-ramp was widened to three lanes.

2030 8-Lane Alternative

As with the 6-Lane Alternative, the 2030 8-Lane Alternative also requires capacity improvements at the intersections of Union Hill Road/Avondale Road Extension and Avondale Road Extension/Avondale Road to accommodate a 40-percent increase in SR 520 eastbound off-ramp volumes. These improvements are reflected above in Tables 46 and 47 and in Figures 14a through 14h in the Appendix, as appropriate.

Intersection Improvements

The following design modifications are needed to satisfy the No Action LOS threshold.

Union Hill Road/Avondale Road Extension

- Add northbound through lane
- Add two southbound through lanes
- Add westbound left-turn lane

Avondale Road Extension/Avondale Road

- Add northbound right-turn lane
- Add westbound left-turn lane

As with the 6-Lane Alternative, the additional westbound left turn lane would be the third left turn lane, and could not be provided without widening the SR 520 WB on-ramp to provide three acceptance lanes. Additional analysis and resulting design changes for the Avondale interchange will be developed as part of the DEIS.

6. SUMMARY AND COMPARISON OF ALTERNATIVES

This chapter includes comparative summaries of AM and PM peak hour intersection levels of service and critical queues, for Year 2000 existing conditions followed by the each of the 2030 Alternatives: No Action, 6-Lane Build and 8-Lane Build. (The S&P Alternative is identical to the 2030 No Action Alternative in terms of intersection performance measures.) Following the comparison of AM and PM conditions for each scenario are tables comparing intersection level of service and volume-to-capacity ratio for all of the 2030 Alternatives together.

6.1 SUMMARY OF EXISTING TRAFFIC OPERATIONS

Table 48 and 49 provide a summary of existing traffic operations at the intersections analyzed for existing traffic operations. Operational measures reported include intersection level of service, average delay, volume-to-capacity ratio and critical queue. For purposes of this report, critical queues are calculated average queues that exceed available turn lane storage, or extend back into the adjacent upstream intersection. An intersection may have one or more critical queues, or it may not have any, depending on factors including the volume and proportion of individual traffic movements, intersection traffic control and lane geometry, and intersection spacing. Shaded cells in the table indicate locations that were not analyzed for existing conditions.

Table 48. Existing Westside Local Traffic Operations Summary

	AM Peak Hour				PM Peak Hour			
Intersection	**LOS**	**Delay (sec)**	**V/C**	**Critical Queue**	**LOS**	**Delay (sec)**	**V/C**	**Critical Queue**
I-5/Stewart St. Interchange								
Denny Way/Stewart St.	D	37	1.02	WBL 350'	B	13	0.80	
John St./Eastlake Ave.	D	37	0.95	SBT 200'	B	11	0.68	SBT 125'
I-5/Mercer St. Interchange								
Mercer St./Fairview Ave./I-5 Ramps	F	109	1.39	WBL 675' WBR 1825'	F	175	1.78	EBTL 2000' NBR 1250' WBL 275' WBR 950'
Valley St./Fairview Ave. N	B	18	0.92		C	34	0.97	
Fairview Ave. N/Eastlake Ave.	A	5	0.42		A	7	0.62	
SR 520/Harvard Ave. Interchange								
Roanoke St./10th Ave. E	B	13	0.64		B	14	0.71	
Roanoke St./Harvard Ave./SR 520 WB Off Ramp	C	33	0.96		E	62	1.20	EBLT 300' SBL 250' SBLR 225'
Roanoke St./Boylston Ave. E	C	21	0.87		C	24	0.85	
SR 520/Montlake Blvd. Interchange								

Table 48 (cont'd). Existing Westside Local Traffic Operations Summary

Intersection	AM Peak Hour				PM Peak Hour			
	LOS	Delay (sec)	V/C	Critical Queue	LOS	Delay (sec)	V/C	Critical Queue
Montlake Blvd./E Roanoke St.	A	9	0.67		A	7	0.64	
Montlake Blvd. NE/SR 520 EB Ramp	F	123	1.81	EBL 300' SBL 475' SBT 350' NBL 175' NBT 750'	F	98.4	1.49	EBL 425' EBT 425' NBT 575'
Montlake Blvd. NE/SR 520 WB Ramp	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Montlake Blvd. NE/E Hamlin St.	B	13	0.93	NBL 200' NBT 350' SBTR 400'	A	10	0.84	NBL 175'
Montlake Blvd. NE/E Shelby St.	C	26	0.97	NBT 1005' SBT 610'	C	33	1.05	NBT 1100'
Montlake Blvd. NE/NE Pacific St.	D	38	1.03	NB L 375' SBT 800' SER 425'	C	30	1.00	
Montlake Blvd. NE/NE Pacific Pl.	B	13	0.79	EBL 100'	E	78	1.27	EBL 275' NBT 100
Montlake Blvd. NE/25th Ave. NE	B	17	0.72		B	13	0.80	
Montlake Blvd./Walla Walla Rd./NE 44th St.	A	10	0.65		A	7	0.81	
Montlake Blvd./NE 45th St.	B	12	0.69		B	16	0.89	
25th Ave. NE/Pend Oreille Rd./NE 44th St.	C	20	0.72		B	19	0.57	
NE Pacific St./NE Pacific Pl.	D	43	1.19	SEL 675'	D	40	1.15	SEL 625'
NE Pacific St./15th Ave. NE	C	32	0.88	SBL 300'	D	35	0.89	SBL 275'
Lake Washington Blvd./SR 520 EB On/WB Off Ramps	C	18	N/A	N/A	C	20	N/A	N/A

Table 49. Existing Eastside Local Traffic Operations Summary

Intersection	AM Peak Hour				PM Peak Hour			
	LOS	Delay (sec)	V/C	Critical Queue	LOS	Delay (sec)	V/C	Critical Queue
84th Ave. NE Interchange								
84th Ave. NE/SR 520 WB On Ramp	B	11	0.61		B	12	0.68	
84th Avenue NE/SR 520 EB Off-Ramp	C	22	0.89		D	33	0.99	
92nd Ave. NE Interchange								
92nd Ave. NE/SR 520 EB On /Points Dr.	A	6	0.08		A	5	0.17	
92nd Ave. NE/SR 520 WB Off/NE 33rd St.	C	19	0.59		C	17	0.53	
Bellevue Way Interchange								
Bellevue Way/NE 38th St.	B	11	0.70		D	44	1.13	NBT 1180'
Bellevue Way/NE Northup Way	C	26	0.72		D	52	1.15	SBL 400'
Bellevue Way/NE Points Drive								
Bellevue Way/SR 520 WB On/EB Off Ramps								
Bellevue Way/SR 520 EB On/WB Off Ramps								
Bellevue Way/NE 34th Pl.								
108th Ave. NE Interchange								
108th Ave. NE/SR 520 EB On Ramp	B	11	0.69		B	12	0.47	
108th Ave. NE/SR 520 WB Ramps	D	36	1.13	WBTR 340'	C	35	1.13	WBL 290'
108th Ave. NE/NE Northup Way	E	62	1.30		E	62	1.26	NBL 350'
								WBL 400
108th Ave. NE/HOV Direct Access Ramps								
108th Ave. NE/NE 34th Pl.								
124th Ave. NE Interchange								
124th Ave. NE/Northup Way	C	31	0.83		D	48	0.93	EBL 240'
120th Ave. NE/Northup Way	A	8	0.59		B	18	0.75	
NE 24th St./Northup Way	A	9	0.70		B	17	0.83	
116th Ave. NE.(north T)/Northup Way	D	44	1.14	WBT 590'	E	63	1.37	WBT 810'
116th Ave. NE.(south T)/Northup Way	C	31	1.02		B	18	0.91	
I-405 NB On & Off Ramps/Northup Way								
I-405 SB On & Off Ramps/Northup Way								
148th Ave. NE Interchange								
148th Ave. NE/NE 24th St.	E	59	1.10	SBL 740'	F	94	1.55	EBL 490'
								WBL 330'
								SBL 250'
148th Ave. NE/SR 520 EB Ramps	C	27	0.88		B	16	0.83	
148th Ave. NE/SR 520 WB Ramps/NE 29th St.	C	30	0.90		E	57	1.22	

Table 49 (cont'd). Existing Eastside Local Traffic Operations Summary

Intersection	AM Peak Hour				PM Peak Hour			
	LOS	Delay (sec)	V/C	Critical Queue	LOS	Delay (sec)	V/C	Critical Queue
NE 51st St. Interchange								
NE 51st St./SR 520 WB Ramps	B	11	0.74		A	7	0.52	
NE 51st St./SR 520 EB Ramps	B	12	0.73		B	16	0.82	
NE 40th St. Interchange								
NE 40th St./SR 520 WB Ramps	C	24	0.82		B	19	0.78	
NE 40th St./SR 520 EB Ramps	B	14	0.78		B	20	0.71	
NE 40th St./156th Ave. NE	D	43	0.97	EBT 600' EBR 660'	D	54	1.18	NBL 490'
W Lake Sammamish Pkwy Interchange								
SR 520 EB Ramps/W Lake Sammamish Pkwy.	F	126	1.52	EBL 850' SBT 970'	F	155	1.65	SBT 1200' EBL 1100'
SR 520 WB Ramps/W Lake Sammamish Pkwy./Leary Way NE	C	24	0.94		C	31	1.06	
159th PL. NE/NE Leary Way	A	6	0.49		C	23	1.07	
Bear Creek Pkwy/NE Leary Way	A	6	0.75		B	11	0.62	
Bear Creek Pkwy/NE 74th St.	B	11	0.20		D	26	0.71	
Redmond Way Interchange								
Redmond Way/SR 520 WB On	D	37	1.01	WBL 710'	E	74	1.85	WBL 350'
Redmond Way/SR 520 EB Off	C	21	0.86	NBL 390'	D	38	0.91	EBL 1090' NBL 330'
NE 76th St./SR 520 WB Off	B	12	0.17		D	31	0.56	
NE 76th St./SR 520 EB On	A	1	0.20		A	3	0.44	
Redmond Way/NE 70th St.	C	23	0.90		D	37	1.55	
E Lake Sammamish/180th Ave/Redmond Way	F	107	1.51	NBL 330' WBT 580'	D	46	1.15	NBL 420'
Avondale Way Interchange								
Avondale Rd./Union Hill Rd.	A	9	0.57		D	42	1.17	
Union Hill Rd/Avondale Rd. Extension	D	49	1.19	WBL 260'	F	112	1.26	WBL 300' NBT 1230'
Avondale Rd. Extension/ Avondale Rd.	A	4	0.61		C	22	1.05	

6.2 SUMMARY OF 2030 NO ACTION ALTERNATIVE

Tables 50 and 51 summarize the same AM and PM peak hour operational measures for the 2030 No Action Alternative. For purposes of the local traffic analysis, the 2030 No Action Alternative results are identical to those for the 2030 Standards and Preservation Alternative.

Table 50. 2030 No Action Alternative Westside Local Traffic Operations Summary

	AM Peak Hour				PM Peak Hour			
Intersection	**LOS**	**Delay (sec)**	**V/C**	**Critical Queue**	**LOS**	**Delay (sec)**	**V/C**	**Critical Queue**
I-5/Stewart St. Interchange								
Denny Way/Stewart St.	D	45	1.03	WBL 475'	B	15	0.84	
John St./Eastlake Ave.	C	34	0.88	SBT 250'	B	11	0.67	SBT 125'
I-5/Mercer St. Interchange								
Mercer St./Fairview Ave./I-5 Ramps	F	92	1.26	EBTL 800' WBL 575' WBR 1550' NBT 200'	F	180	1.86	EBTL 1425' EBR 950' WBR 575' NBT 375 NBR 875'
Valley St./Fairview Ave. N	B	16	0.89		F	93	1.27	NBL 425' NET 400' SWT 550'
Fairview Ave. N/Eastlake Ave.	A	5	0.41		B	10	0.83	
SR 520/Harvard Ave. Interchange								
Roanoke St./10th Ave. E	B	11	0.76		B	14	0.97	
Roanoke St./Harvard Ave./SR 520 WB Off Ramp	D	50	1.15	EBL/T 150' SBL 200'	F	83	1.38	EBL/T 400' NBR 75' SBL 350' SBL/R 325'
Roanoke St./Boylston Ave. E	C	21	0.88		B	19	0.86	
SR 520/Montlake Blvd. Interchange								
Montlake Blvd./E Roanoke St.	B	13	0.79		A	9	0.67	
Montlake Blvd. NE/SR 520 EB Ramp	F	169	2.23	EBL 425' EBT 400' WBR 325' SBL 650' SBT 475' NBL 275' NBT 975'	F	119	1.65	EBL 500' EBT 500' WBR 325' SBL 200' SBT 350' NBT 675'
Montlake Blvd. NE/SR 520 WB Ramp		N/A				N/A		
Montlake Blvd. NE/E Hamlin St.	C	31	1.12	NBL/U 350' NBT 1125' SBT 900'	B	14	1.03	NBL/U 225' NBT 1175'

Table 50 (cont'd). 2030 No Action Alternative Westside Local Traffic Operations Summary

Intersection	AM Peak Hour				PM Peak Hour			
	LOS	Delay (sec)	V/C	Critical Queue	LOS	Delay (sec)	V/C	Critical Queue
Montlake Blvd. NE/E Shelby St.	E	73	1.19	NBT 1475' SBT 1375'	F	86	1.32	NBT 1675' SBT 1050'
Montlake Blvd. NE/NE Pacific St.	E	76	1.31	NBL 450' NBT 825' SBT 1000' SER 525'	E	63	1.32	NBL 275' NBT 1300' SBT 600' SER 500'
Montlake Blvd. NE/NE Pacific Pl.	C	22	1.01	EBL 100' SBT 825'	F	107	1.63	EBL 350' NBT 1450'
Montlake Blvd. NE/25th Ave. NE	A	8	0.86		A	9	0.86	
Montlake Blvd./Walla Walla Rd./NE 44th St.	A	5	0.78		B	13	0.97	
Montlake Blvd./NE 45th St.	B	11	0.84		C	32	1.06	EBT 1100' SEL 225'
25th Ave. NE/Pend Oreille Rd./NE 44th St.	B	16	0.77		B	13	0.62	
NE Pacific St./NE Pacific Pl.	D	42	1.03	SBL 325'	C	25	0.92	SEL 275'
NE Pacific St./15th Ave. NE	C	35	0.95	SBL 325'	D	36	0.95	SBL 275'
Lake Washington Blvd./SR 520 EB On/WB Off Ramps	E	38	N/A		F	58	N/A	

Table 51. 2030 No Action Alternative Eastside Local Traffic Operations Summary

Intersection	AM Peak Hour				PM Peak Hour			
	LOS	Delay (sec)	V/C	Critical Queue	LOS	Delay (sec)	V/C	Critical Queue
84th Ave. NE Interchange								
84th Ave. NE/SR 520 WB On Ramp	B	11	0.63		B	12	0.68	
84th Avenue NE/SR 520 EB Off-Ramp	E	38	1.06		E	43	1.06	
92nd Ave. NE Interchange								
92nd Ave. NE/SR 520 EB On /Points Dr.	A	3	0.11		A	7	0.27	
92nd Ave. NE/SR 520 WB Off/NE 33rd St.	F	56	0.95	WBLR 310'	E	43	0.86	
Bellevue Way Interchange								
Bellevue Way/NE 38th St.	B	16	0.93		E	77	1.34	NBT 1930'
Bellevue Way/NE Northup Way	C	26	0.88		D	53	1.10	NBT 640' SBL 370' SBT 700' WBL 490'
Bellevue Way/NE Points Drive								
Bellevue Way/SR 520 WB On/EB Off Ramps								
Bellevue Way/SR 520 EB On/WB Off Ramps								
Bellevue Way/NE 34th PL.								
108th Ave. NE Interchange								
108th Ave. NE/SR 520 EB On Ramp	D	29	0.56		F	70	1.76	NBL 920' SBT 320' WBL 400'
108th Ave. NE/SR 520 WB Ramps	B	12	0.91	WBL 350'	B	19	0.90	
108th Ave. NE/NE Northup Way	E	62	1.10	NBL 390' NBT 410' NBR 190'	F	87	1.18	NBL 720' NBT 760' WBL 570' WBTR 370' SBTR 370'
108th Ave. NE/HOV Direct Access Ramps								
108th Ave. NE/NE 34th PL.								
124th Ave. NE Interchange								
124th Ave. NE/Northup Way	C	24	0.77	SBL 220'	C	34	0.85	SBL 250' WBT 330' WBR 350'

Table 51 (cont'd). 2030 No Action Alternative Eastside Local Traffic Operations Summary

Intersection	AM Peak Hour				PM Peak Hour			
	LOS	Delay (sec)	V/C	Critical Queue	LOS	Delay (sec)	V/C	Critical Queue
120th Ave. NE/Northup Way	A	10	0.57		C	22	0.89	NBL 290' EBT 360'
NE 24th St./Northup Way	B	12	0.71	SBR 290'	C	34	1.05	SBR 560' WBT 820'
116th Ave. NE/Northup Way (north T)	B	19	0.89	SBL 210'	C	35	1.09	SBL 200' EBL 450' WBT 900'
116th Ave. NE/Northup Way (south T)	C	25	0.96	WBL 350'	D	42	1.03	NBR 650' EBT 700'
I-405 NB On & Off Ramps/Northup Way								
I-405 SB On & Off Ramps/Northup Way								
148th Ave. NE Interchange								
148th Ave. NE/NE 24th St.	E	80	1.28	NBT 790' SBL 1130' SBT 720' EBL 210' WBR 520'	F	123	1.47	NBT 1070' SBL 420' SBT 990' EBL 290' EBTR 400' WBL 530' WBT 420' WBR 900'
148th Ave. NE/SR 520 EB Ramps	D	40	1.07	EBR 650'	C	25	1.01	NBT 400' EBR 430'
148th Ave. NE/SR 520 WB Ramps/NE 29th Street	C	32	1.02		F	94	1.71	WBL 470' WBT 1330' SBT 670'
NE 51st St. Interchange								
NE 51st St./SR 520 WB Ramps	B	16	0.84		A	5	0.57	
NE 51st St./SR 520 EB Ramps	B	15	0.85		C	28	0.98	NBT 560' EBL 420' WBT 400'
NE 40th St. Interchange								
NE 40th St./SR 520 WB Ramps	C	26	0.88	SBL 310' WBT 330'	C	25	1.11	WBL 450'
NE 40th St./SR 520 EB Ramps	D	50	1.11	NBTR 320' EBT 1070'	B	14	0.81	EBT 380'
NE 40th St./156th Ave. NE	F	134	1.61	NBL 490' EBT 1100' EBR 1260'	F	123	1.81	NBT 360' NBL 1220' EBT 380' WBTR 940'

Table 51 (cont'd). 2030 No Action Alternative Eastside Local Traffic Operations Summary

Intersection	AM Peak Hour				PM Peak Hour			
	LOS	Delay (sec)	V/C	Critical Queue	LOS	Delay (sec)	V/C	Critical Queue
W Lake Sammamish Pkwy Interchange								
SR 520 EB Ramps/W Lake Sammamish Pkwy.	F	150	1.65	SBT 1030' EBLR 1010'	F	220	2.08	NBT 2700' SBT 2990' EBLR 950'
SR 520 WB Ramps/W Lake Sammamish Pkwy./Leary Wy NE	F	94	1.61	NBT 990' SBR 360' EBR 470' WBT 720'	F	197	2.78	NBR 4610' SBL 1110' SBT 1640' SBR 1330' WBL 1080' WBT 1220'
159th PL. NE/NE Leary Way	B	15	0.92	SBL 190' EBT 530'	F	220	6.65	SBL 1730' EBL 630' EBT 5550' WBT 1920'
Bear Ck. Pkwy/NE Leary Way	A	9	0.92	WBT 370'	F	127	1.93	NBT 1060' EBT 1470' EBR 3570' WBT 1080'
Bear Ck. Pkwy/NE 74th St.	B	11	0.18		F	>300	1.36	
Redmond Way Interchange								
Redmond Way/SR 520 WB On	C	24	0.98	EBR 170'	E	65	1.09	SBT 470' EBL 250' EBT 610' WBT 980' WBL 470'
Redmond Way/SR 520 EB Off	C	31	1.02	NBL 390'	D	44	1.06	NBR 790' WBT 780'
NE 76th St./SR 520 WB off	C	16	0.25		E	45	0.77	
NE 76th St./SR 520 EB On	A	9	0.25		A	3	0.48	
Redmond Way/NE 70th St.	B	11	0.78	NBT 690'	E	77	1.20	SBT 1940'
E Lake Sammamish/180th Ave/Redmond Way	D	42	1.00		D	43	1.10	EBT 910'
Avondale Way Interchange								
Avondale Rd./Union Hill Rd.	A	10	0.59		D	41	1.17	NBT 690'
Union Hill Rd/Avondale Rd. Extension	E	66	1.18	SBT 810' WBL 340'	F	104	1.30	NBT 1280' EBT 440' WBT 480'
Avondale Rd. Extension/ Avondale Rd.	A	5	0.80	WBL 310'	E	74	1.31	NBR 1550' EBTR 770'

6.3 SUMMARY OF 2030 6-LANE BUILD ALTERNATIVE

Tables 52 and 53 summarize AM and PM peak hour operational measures for the 2030 6-Lane Alternative. For both the 2030 6-Lane and 2030 8-Lane Alternatives, the summary tables also list the potential design enhancements (intersection modifications) that would be necessary to meet or exceed 2030 No Action performance measures. As noted in the previous chapter, the feasibility of potential design modifications will be evaluated further as part of the DEIS analysis.

Table 52. 2030 6 Lane Westside Local Traffic Operations Summary

	AM Peak Hour				PM Peak Hour				
Intersection	**LOS**	**Delay (sec)**	**V/C**	**Critical Queue**	**LOS**	**Delay (sec)**	**V/C**	**Critical Queue**	**Modifications**
I-5/Stewart St. Interchange									
Denny Way/Stewart St.	D	37	1.02	WBL 350'	B	13	0.76		Protected/permissive WBL
John St./Eastlake Ave.	D	36	0.93	SBT 375'	B	11	0.61	SBT 125'	3rd I-5 off-ramp through lane
I-5/Mercer St. Interchange									
Mercer St./Fairview Ave./I-5 Ramps	E	64	1.13	EBTL 975' WBL 650' WBR 1000' NBT 225'	F	170	1.69	EBTL 1850' WBL 225' WBR 1400' NBT 350' NBR 1125'	3rd WBR (needed for AM); traffic signal interconnect
Valley St./Fairview Ave. N	B	17	0.90	NBL 325'	D	43	1.08	NBL 400' SWT 325'	Signal interconnect to allow double cycling with I-5 southbound off-ramp intersection
Fairview Ave. N/Eastlake Ave.	A	5	0.41		A	8	0.62		
SR 520/Harvard Ave. Interchange									
Roanoke St./10th Ave. E	A	6	0.72		A	9	0.78		Changed WBLT to WBL

Table 52 (cont'd). 2030 6 Lane Westside Local Traffic Operations Summary

Intersection	AM Peak Hour LOS	AM Delay (sec)	AM V/C	AM Critical Queue	PM Peak Hour LOS	PM Delay (sec)	PM V/C	PM Critical Queue	Modifications
Roanoke St./Harvard Ave./SR 520 WB Off Ramp	D	36	0.96		E	74	1.32	EBL 350' WBT 300' WBR 175' NBT 225' SBL 350' SBT 325'	Changed EBLT to EBL
Roanoke St./Boylston Ave. E	C	21	0.88		B	18	0.86		
SR 520/Montlake Blvd. Interchange									
Montlake Blvd./E Roanoke St.	B	14	0.85	NBL 225''	B	11	0.73		
Montlake Blvd. NE/SR 520 EB Ramp	F	138	1.91	EBL 450' SBL 775' NBR 1300'	E	75	1.24	EBL 350' EBT 275' WBT 250' WBR 225' SBL 275' NBR 750'	
Montlake Blvd. NE/SR 520 WB Ramp	D	49	1.90	NBL 350' SBT 300'	A	9	0.94	NBT 500' SBT 225'	Added SBT
Montlake Blvd. NE/E Hamlin St.	A	7	0.96	NBT 500'	B	12	1.00	NBT 1375'	
Montlake Blvd. NE/E Shelby St.	D	42	1.15	NBT 1750'	E	62	1.25	NBT 2025'	Added SBT
Montlake Blvd. NE/NE Pacific St.	E	60	1.21	NBL 425' NBT 575' SBT 950' EBR 725'	D	45	1.16	NBT 1350' SBT 325 EBR 575'	Converted SBR to SBTR lane
Montlake Blvd. NE/NE Pacific Pl.	B	17	0.92		E	55	1.22	EBL 350' WBL 325' NBT 1550'	Converted SBR to SBTR lane, WBLTR to WBR, & EBTR to EBT & added EBR

Table 52 (cont'd). 2030 6 Lane Westside Local Traffic Operations Summary

Intersection	AM Peak Hour LOS	AM Delay (sec)	AM V/C	AM Critical Queue	PM Peak Hour LOS	PM Delay (sec)	PM V/C	PM Critical Queue	Modifications
Montlake Blvd. NE/25th Ave. NE	B	12	0.93		A	7	0.84		Placed in a common zone for cycle length optimization with the other north intersections.
Montlake Blvd./Walla Walla Rd./NE 44th St.	A	5	0.86		B	13	0.97	NBT 550'	Placed in a common zone for cycle length optimization with the other north intersections.
Montlake Blvd./NE 45th St.	B	12	0.90		C	27	1.06	EBT 950' EBL 200'	Placed in a common zone for cycle length optimization with the other north intersections.
25th Ave. NE/Pend Oreille Rd./NE 44th St.	A	10	0.72		B	12	0.57		Placed in a common zone for cycle length optimization with the other north intersections.
NE Pacific St./NE Pacific Pl.	A	9	0.93	EBL 350'	B	12	0.92	EBL 375'	Modified Phasing to allow EBT to run concurrently with EBL after ped phase
NE Pacific St./15th Ave. NE	D	38	0.93	SBL 450' EBT 500'	C	32	0.89	SBL 350'	Converted NBTR to NBT & NBR and added an overlap phase.
Lake Washington Blvd./SR 520 EB On/WB Off Ramps	D	42	1.11	SBL 300' NBR 300'	B	16	0.88		Add a 2-Phase Signal
SR 520/Montlake Blvd. Interchange (with 2nd parallel bascule bridge)									
Montlake Blvd./E Roanoke St.	B	13	0.85	NBL 225'	B	11	0.73	NBL 150'	
Montlake Blvd. NE/SR 520 EB Ramps	F	138	1.70	EBL 625' WBT 275' WBR 475' SBL 1025' NBR 1725'	E	75	1.24	EBL 350' EBT 300' WBT 250' WBR 225' SBL 275' NBR 750'	
Lake Washington Blvd./SR 520 EB On/WB Off Ramps	D	36	1.11	NBR 75'	B	17	0.89		Add a 2-Phase Signal
Montlake Blvd. NE/SR 520 WB Ramps	D	42	1.19	NBL 800' NBT 550' SBT 1225' SBR 1400'	A	10	0.94	NBT 525' SBT 375'	WB off-ramp HOV right-turns merge with GP right-turns before intersection. Added SBT.

Table 53. 2030 6 Lane Eastside Local Traffic Operations Summary

Intersection	AM Peak Hour				PM Peak Hour				Modifications
	LOS	Delay (sec)	V/C	Critical Queue	LOS	Delay (sec)	V/C	Critical Queue	
84th Ave. NE Interchange									
84th Ave. NE/SR 520 WB On Ramp	B	11	0.62		B	12	0.68		
84th Avenue NE/SR 520 EB Off-Ramp	E	35	1.03		E	43	1.06		
92nd Ave. NE Interchange									
92nd Ave. NE/SR 520 EB On /Points Dr.	A	4	0.45		A	9	0.46		
92nd Ave. NE/SR 520 WB Off/NE 33rd St.	F	186	1.33	WBLTR 740'	F	58	0.91	WBLR 230'	
Bellevue Way Interchange									
Bellevue Way/NE 38th St.	A	9	0.68		C	27	0.90	NBT 830'	NBT
Bellevue Way/NE Northup Way									
Bellevue Way/NE Points Drive	B	19	0.88		E	57	1.17	NBL 330'	WBL
								SBT 1010'	
								EBR 280'	
Bellevue Way/SR 520 WB On/EB Off Ramps	C	32	0.91		D	49	1.25	NBT 430'	
								NBR 420'	
								SBR 1050'	
								WBR 600'	
Bellevue Way/SR 520 EB On/WB Off Ramps	B	15	0.70		C	21	0.91	NBT 450'	
Bellevue Way/NE 34th PL.	B	11	0.77		C	27	0.96		New Signalized Intersection
108th Ave. NE Interchange									
108th Ave. NE/SR 520 EB On Ramp									

Table 53 (cont'd). 2030 6 Lane Eastside Local Traffic Operations Summary

Intersection	AM Peak Hour LOS	AM Delay (sec)	AM V/C	AM Critical Queue	PM Peak Hour LOS	PM Delay (sec)	PM V/C	PM Critical Queue	Modifications
108th Ave. NE/SR 520 WB Ramps									
108th Ave. NE/NE Northup Way	D	42	0.98	SBL 490'	D	39	0.95	SBL 350'	EBL, WBL
108th Ave. NE/HOV Direct Access Ramps	A	2	0.26		A	2	0.55		
108th Ave. NE/NE 34th PL.	B	13	0.75		C	22	0.94		New Signalized Intersection
124th Ave. NE Interchange									
124th Ave. NE/Northup Way	C	24	0.90		C	31	0.94		NBR, SBR
120th Ave. NE/Northup Way	C	21	0.97		D	46	1.17	SBR 440'	New Signalized Intersection
NE 24th St./Northup Way									
116th Ave. NE./Northup Way (north T)	D	45	1.09		D	54	1.16		New Signalized Intersection
116th Ave. NE./Northup Way (south T)									
I-405 NB On & Off Ramps/Northup Way	B	13	0.83		B	18	0.95		New Signalized Intersection
I-405 SB On & Off Ramps/Northup Way	C	27	0.96		D	54	1.14		New Signalized Intersection
148th Ave. NE Interchange									
148th Ave. NE/NE 24th St.	F	126	1.76	NBT 1180' SBL 940' WBR 1510'	F	130	1.59	SBL 380' EBL 330' WBL 530' WBR 1560'	High volume SBL and WBR movements require triple SBL and a free WBR in order to meet 2030 No-Action LOS threshold.
148th Ave. NE/SR 520 EB Ramps	D	36	1.18	NBR 1070' EBR 650'	C	32	1.11	NBR 870'	
148th Ave. NE/SR 520 WB Ramps/NE 29th Street	D	39	0.98	WBL 500' WBR 470'	E	59	1.37	SBT 610' WBT 750'	
NE 51st St. Interchange									
NE 51st St./SR 520 WB Ramps	C	22	0.93		A	8	0.63		

Table 53 (cont'd). 2030 6 Lane Eastside Local Traffic Operations Summary

Intersection	AM Peak Hour LOS	AM Delay (sec)	AM V/C	AM Critical Queue	PM Peak Hour LOS	PM Delay (sec)	PM V/C	PM Critical Queue	Modifications
NE 51st St./SR 520 EB Ramps	C	27	0.96		C	21	0.89		
NE 40th St. Interchange									
NE 40th St./SR 520 WB Ramps	C	31	0.95	SBL 450'	B	19	0.79	WBL 280'	
NE 40th St./SR 520 EB Ramps	D	38	1.36		B	11	0.82		NBL, EBT, Free NBR
NE 40th St./156th Ave. NE	F	110	1.49	EBT 920' EBR 1890'	E	67	1.23	NBL 570' EBR 260' WBT 870'	NBL, SBL, Free EBR
W Lake Sammamish Pkwy Interchange									
SR 520 EB Ramps/W Lake Sammamish Pkwy.	F	150	1.60	SBT 1240' EBLR 870'	F	214	1.99	NBL 580' NBT 3070' SBT 3210' EBL 910'	
SR 520 WB Ramps/W Lake Sammamish Pkwy./Leary Wy NE	F	91	2.77	NBT 1130' EBR 800'	F	212	2.24	NBT 1780' NBR 4770' SBL 620' SBT 2410' SBR 2200' EBL 870' EBT 1490'	SBL
159th PL. NE/NE Leary Way	A	5	0.60		F	123	1.48	SBL 910' EBL 500' EBT 2390' WBT 1990'	SBL, EBT, WBR

Table 53 (cont'd). 2030 6 Lane Eastside Local Traffic Operations Summary

Intersection	AM Peak Hour LOS	AM Delay (sec)	AM V/C	AM Critical Queue	PM Peak Hour LOS	PM Delay (sec)	PM V/C	PM Critical Queue	Modifications
Bear Ck. Pkwy/NE Leary Way	B	16	0.84		F	148	1.69	NBL 1570' EBT 1530' EBR 2810'	Free EBR, WBT
Bear Ck. Pkwy/NE 74th St.	B	11	0.46		D	38	0.98	SBL 380' SBT 1050' WBR 450'	SIG
Redmond Way Interchange									
Redmond Way/SR 520 WB On	B	16	0.92		D	51	1.10	SBT 510' EBL 250' WBT 1040'	WBR
Redmond Way/SR 520 EB Off	B	16	0.84		F	104	1.35	NBR 1440' EBT 850'	NBL
NE 76th St./SR 520 WB off	B	18	0.91	WBT 610'	B	16	0.91	WBT 660'	SIG
NE 76th St./SR 520 EB On	A	9	0.32		A	3	0.53		
Redmond Way/NE 70th St.	C	21	0.88		E	72	1.17	SBT 1460'	NBT, SBT, SBR
E Lake Sammamish/180th Ave/Redmond Way	D	46	1.03		D	40	1.04	SBR 670'	NBL, EBT, Free EBR, WBT
Avondale Way Interchange									
Avondale Rd./Union Hill Rd.	A	9	0.80		C	24	1.01	NBT 830'	
Union Hill Rd/Avondale Rd. Extension	F	90	1.25	SBT 1150'	E	71	1.18	NBT 1150'	NBT, SBT
Avondale Rd. Extension/ Avondale Rd.	A	4	0.75		E	58	1.16	NBR 1310' EBT 770'	NBR, WBL

6.4 SUMMARY OF 2030 8-LANE BUILD ALTERNATIVE

Due to increased travel demand generated by additional capacity on SR 520 with the 2030 8-Lane Alternative, both the Westside and Eastside local street networks require substantial design modifications at nearly all the interchanges and most of the affected intersections included in the analysis, in order to meet or exceed 2030 No Action Alternative performance measures. Tables 54 and 55 summarize AM and PM peak hour operational measures for the 2030 8-Lane Alternative, and list the potential design enhancements (intersection modifications) identified in order to meet or exceed 2030 No Action performance measures. As noted in the previous chapter, the feasibility of potential design modifications will be evaluated further as part of the DEIS analysis.

Table 54. 2030 8 Lane Westside Local Traffic Operations Summary

	AM Peak Hour				PM Peak Hour				
Intersection	**LOS**	**Delay (sec)**	**V/C**	**Critical Queue**	**LOS**	**Delay (sec)**	**V/C**	**Critical Queue**	**Modifications**
I-5/Stewart St. Interchange									
Denny Way/Stewart St.	D	40	1.00	WBL 375'	B	12	0.84		Protected/permissive WBL (needed PM only)
John St./Eastlake Ave.	C	32	0.87	SBT 250'	B	11	0.61	SBT 125'	3rd WBT from I-5 off-ramp
I-5/Mercer St. Interchange									
Mercer St./Fairview Ave./I-5 Ramps	E	70	1.15	EBTL 1000' WBL 675' WBR 1200' NBT 225'	F	151	1.77	EBTL 1500' WBL 200' WBR 475' NBT 225 NBR 900'	3rd WBR
Valley St./Fairview Ave. N	B	17	0.88		D	43	1.08	NBL 400' SWT 325'	Adjusted splits (AM peak only)
Fairview Ave. N/Eastlake Ave.	A	5	0.41		A	7	0.64		
SR 520/Harvard Ave. Interchange									
Roanoke St./10th Ave. E	A	9	0.75		A	9	0.81		Restripe WBL lane to left/through.

Table 54 (cont.) 2030 8 Lane Westside Local Traffic Operations Summary

Intersection	AM Peak Hour LOS	AM Delay (sec)	AM V/C	AM Critical Queue	PM Peak Hour LOS	PM Delay (sec)	PM V/C	PM Critical Queue	Modifications
Roanoke St./Harvard Ave./SR 520 WB Off Ramp	D	39	1.01	EBL 150' EBT 350' SBL 175'	E	77	1.32	EBL 350' EBT 300' WBT 325' WBR 225' NBL/T 250' NBR 75' SBL 350' SBL/R 325'	Restripe inside EB lane to left-turn only.
Roanoke St./Boylston Ave. E	B	17	0.85		B	19	0.86		
SR 520/Montlake Blvd. Interchange									
Montlake Blvd./E Roanoke St.	B	19	0.88		B	11	0.73		Per Design Drawings.
Montlake Blvd. NE/SR 520 EB Ramp	F	143	1.87	EBL 400' WBLTR 225' WBR 375' SBL 1025' SBT 325' NBL 230' NBT 1575'	F	98	1.69	EBL 200' WBLTR 150' WBR 150' SBL 250' SBT 400' NBT 750'	Per Design Drawings.
Montlake Blvd. NE/SR 520 WB Ramp	D	51	1.33	NBL 650' NBT 475' SBT 1575' SBR 650'	A	8	0.83	SBT 350'	Per Design Drawings.

Table 54 (cont.) 2030 8 Lane Westside Local Traffic Operations Summary

Intersection	AM Peak Hour LOS	AM Delay (sec)	AM V/C	AM Critical Queue	PM Peak Hour LOS	PM Delay (sec)	PM V/C	PM Critical Queue	Modifications
Montlake Blvd. NE/E Hamlin St.	A	7	0.97	NBT 1000'	B	12	0.99	NBT 650'	Per Design Drawings.
Montlake Blvd. NE/E Shelby St.	D	46	1.20	NBT 300' SBT 2150'	B	18	1.01	NBT 1050' SBT 1000'	Per Design Drawings.
Montlake Blvd. NE/NE Pacific St.	E	75	1.22	NBL 500' SBT 1200' EBL 400' EBT 400' EBR 675'	D	47	1.25	NBT 850' EBL 375'	Added Lanes: EBT, SBT, SBR, NBR, EBR HOV lane. No E/W ped crossings. WB approach restricted to stop/yield control & RT only. Note: SBT lane would merge back in before the Montlake Bridge (lane utilization factor adjusted for LOS analysis). Modifications short of adding a 3rd SB lane could attain LOS F conditions with 100 sec/veh of delay during the AM peak, and bring the PM peak to better than 2030 No Action conditions.
Montlake Blvd. NE/NE Pacific Pl.	C	25	1.03	NBL 350' SBT 1275'	F	83	1.29	EBL/T 75' WB L/T 225' NBT 1325'	No E/W ped crossings, E/W minimum times reduced.
Montlake Blvd. NE/25th Ave. NE	B	12	0.78		A	7	0.80		Add 3rd NBR lane. Add 3rd SWL lane.
Montlake Blvd./Walla Walla Rd./NE 44th St.	A	8	0.90	EBL/T 350'	A	6	0.88		Add 3rd NET lane.
Montlake Blvd./NE 45th St.	B	16	0.92		B	14	0.95	EBL 200'	Add 3rd EBT lane. Add 3rd SBL lane.

Table 54 (cont.) 2030 8 Lane Westside Local Traffic Operations Summary

Intersection	AM Peak Hour				PM Peak Hour				Modifications
	LOS	Delay (sec)	V/C	Critical Queue	LOS	Delay (sec)	V/C	Critical Queue	
25th Ave. NE/Pend Oreille Rd./NE 44th St.	C	25	0.87	NBL 275' SBL 325'	B	13	0.66	NBL 125'	Add SBR Note: Operating at half the system cycle length would improve the AM LOS to LOS B.
NE Pacific St./NE Pacific Pl.	A	7	0.85		B	13	0.94		Ped crossing relocated.
NE Pacific St./15th Ave. NE	D	37	0.94	SBL 325'	C	30	0.89	SBL 250'	Add 2nd SBL lane Add NBR lane with overlap phase.
Below-Grade Tunnel Intersection	A	9	0.69		A	10	0.98		
Lake Washington Blvd./SR 520 EB On/WB Off Ramps	A	7	0.72		B	13	0.97		Add a 2-Phase Signal Add a 2nd NWR lane.
Pacific St. Extension/SR 520 WB Off-Ramp	A	6	0.58		D	38	1.09	WBR 125'	

Table 55. 2030 8 Lane Eastside Local Traffic Operations Summary

Intersection	AM Peak Hour LOS	AM Peak Hour Delay (sec)	AM Peak Hour V/C	AM Peak Hour Critical Queue	PM Peak Hour LOS	PM Peak Hour Delay (sec)	PM Peak Hour V/C	PM Peak Hour Critical Queue	Modifications
84th Ave. NE Interchange									
84th Ave. NE/SR 520 WB On Ramp	B	11	0.62		B	12	0.68		
84th Avenue NE/SR 520 EB Off-Ramp	E	40	1.06		E	43	1.06		
92nd Ave. NE Interchange									
92nd Ave. NE/SR 520 EB On /Points Dr.	A	5	0.48		A	9	0.48		
92nd Ave. NE/SR 520 WB Off/NE 33rd St.	F	150	1.24	WBLR 620'	F	62	0.92	WBLR 240'	
Bellevue Way Interchange									
Bellevue Way/NE 38th St.	B	15	0.85		C	27	1.02		NBTR
Bellevue Way/NE Northup Way									
Bellevue Way/NE Points Drive	B	15	0.85		C	32	1.06	SBT 810'	NBL
Bellevue Way/SR 520 WB On/EB Off Ramps	C	24	0.86		D	36	1.09	NBR 770'	Free SBR, WBL
Bellevue Way/SR 520 EB On/WB Off Ramps	B	13	0.66		C	33	1.09	NBT 600' SBL 300'	
Bellevue Way/NE 34th PL.	A	5	0.77		D	48	1.23	NBT 620' SBL 490'	New Signalized Intersection
108th Ave. NE Interchange									
108th Ave. NE/SR 520 EB On Ramp									
108th Ave. NE/SR 520 WB Ramps									
108th Ave. NE/NE Northup Way	C	30	0.93		E	63	1.18	EBL 640' WBR 340'	
108th Ave. NE/HOV Direct Access Ramps	A	3	0.27		A	3	0.57		
108th Ave. NE/NE 34th PL.	B	11	0.74		C	22	0.96	NBL 480'	New Signalized Intersection

Table 55 (cont.). 2030 8 Lane Eastside Local Traffic Operations Summary

Intersection	AM Peak Hour LOS	AM Delay (sec)	AM V/C	AM Critical Queue	PM Peak Hour LOS	PM Delay (sec)	PM V/C	PM Critical Queue	Modifications
124th Ave. NE Interchange									
124th Ave. NE/Northup Way	C	24	0.76		D	36	0.98	WBR 240'	NBR, SBL, SBR
120th Ave. NE/Northup Way	B	19	0.94		D	45	1.11	NBL 220' SBR 420'	New Signalized Intersection
NE 24th St./Northup Way									
116th Ave. NE.(north T)/Northup Way	D	41	1.02	EBR 370'	D	54	1.15	NBL 310'	New Signalized Intersection
116th Ave. NE.(south T)/Northup Way									
I-405 NB On & Off Ramps/Northup Way	D	50	1.13	EBL 260' WBR 260'	D	53	1.15	EBL 360' WBT 670'	New Signalized Intersection
I-405 SB On & Off Ramps/Northup Way	C	27	0.93		D	38	1.03		New Signalized Intersection
148th Ave. NE Interchange									
148th Ave. NE/NE 24th St.	E	77	1.31	SBL 940' EBL 260' WBR 1170'	F	96	1.55	SBL 380' SBT 780' EBL 330' WBR 1430'	EBR, WBL, NBT
148th Ave. NE/SR 520 EB Ramps	B	20	0.95		C	25	1.04	EBR 410'	Free WBR, Free NBR
148th Ave. NE/SR 520 WB Ramps/NE 29th Street	D	39	0.98	WBL 200' WBR 410' NBT 530'	E	57	1.36	WBT 750'	WBR, SBR
NE 51st St. Interchange									
NE 51st St./SR 520 WB Ramps	B	14	0.77		A	9	0.64		SBR
NE 51st St./SR 520 EB Ramps	B	18	0.92		C	22	0.97		NBL

Table 55 (cont.). 2030 8 Lane Eastside Local Traffic Operations Summary

Intersection	AM Peak Hour LOS	AM Peak Hour Delay (sec)	AM Peak Hour V/C	AM Peak Hour Critical Queue	PM Peak Hour LOS	PM Peak Hour Delay (sec)	PM Peak Hour V/C	PM Peak Hour Critical Queue	Modifications
NE 40th St. Interchange									
NE 40th St./SR 520 WB Ramps	C	23	0.86		C	31	1.15	WBL 480'	SBL
NE 40th St./SR 520 EB Ramps	D	37	1.34		B	18	0.92	EBL 270'	EBT, Free NBR
NE 40th St./156th Ave. NE	F	129	1.56	EBR 1560' SBL 340'	E	71	1.17	NBL 750' WBT 1060'	Free EBR, WBR, NBR, SBR
W Lake Sammamish Pkwy Interchange									
SR 520 EB Ramps/W Lake Sammamish Pkwy.	F	190	1.75	EBL 1900' SBT 2040'	F	213	2.06	NBL 770' NBT 3060' SBT 3250' EBL 920'	A direct fly-over ramp to accommodate a very high volume eastbound left-turn movement.
SR 520 WB Ramps/W Lake Sammamish Pkwy./Leary Wy NE	F	92	1.35	NBT 1570' NBR 1280' EBL 500' EBR 660'	F	221	2.41	NBT 1770' NBR 4970' SBL 620' SBT 2520' SBR 2150' SBL 1120' WBT 1310'	SBL
159th PL. NE/NE Leary Way	A	9	0.65		F	109	1.46	SBL 880' EBT 2470' WBT 1930'	SBL, EBL, EBT, WBT
Bear Ck. Pkwy/NE Leary Way	B	18	0.83		F	147	1.69		WBT
Bear Ck. Pkwy/NE 74th St.	B	17	0.43		C	26	1.04	WBR 370'	SIG
Redmond Way Interchange									
Redmond Way/SR 520 WB On	B	14	0.92		E	56	1.28	EBL 220' WBT 910'	SBL

Table 55 (cont.). 2030 8 Lane Eastside Local Traffic Operations Summary

Intersection	AM Peak Hour LOS	AM Peak Hour Delay (sec)	AM Peak Hour V/C	AM Peak Hour Critical Queue	PM Peak Hour LOS	PM Peak Hour Delay (sec)	PM Peak Hour V/C	PM Peak Hour Critical Queue	Modifications
Redmond Way/SR 520 EB Off	B	19	0.85		F	133	1.64	NBR 1560' EBT 700'	NBL
NE 76th St./SR 520 WB Off	C	23	0.81		B	18	0.85		SIG, WBL
NE 76th St./SR 520 EB On	A	9	0.37		A	3	0.61		
Redmond Way/NE 70th St.	B	11	1.02	NBT 880'	E	80	1.50	SBT 1300' EBL 240'	NBT, SBT, SBR
E Lake Sammamish/180th Ave/Redmond Way	E	67	1.16		D	49	1.20	EBT 670' EBR 1160'	NBL, EBT, Free EBR, WBT
Avondale Way Interchange									
Avondale Rd./Union Hill Rd.	B	12	0.56		C	25	1.01		
Union Hill Rd/Avondale Rd. Extension	E	69	1.14	SBT 1020' WBL 380'	F	114	1.37	NBR 500'	NBT, Two SBT, WBL
Avondale Rd. Extension/Avondale Rd.	A	9	0.93	WBL 450'	F	85	1.33	NBR 1740'	NBR, WBL

6.5 2030 LEVEL OF SERVICE COMPARISON

This section compares 2030 intersection levels of service at all four 2030 Alternatives, first in Tables 56 and 57 for AM peak hour conditions, then in Tables 58 and 59 for the PM peak hour. Level of service results reflect the design modifications listed in Tables 52 through 55 above.

Table 56. 2030 Westside Alternatives Traffic Operations Summary – AM Peak Hour

	No Action		Safety & Preservation		6-Lane Build		8-Lane Build	
Intersection	**LOS**	**V/C**	**LOS**	**V/C**	**LOS**	**V/C**	**LOS**	**V/C**
I-5/Stewart St. Interchange								
Denny Way/Stewart St.	D	1.03	D	1.03	D	1.02	D	1.00
John St./Eastlake Ave.	C	0.88	C	0.88	B	0.69	C	0.87
I-5/Mercer St. Interchange								
Mercer St./Fairview Ave./I-5 Ramps	F	1.26	F	1.26	E	1.13	E	1.15
Valley St./Fairview Ave. N	B	0.89	B	0.89	B	0.90	B	0.88
Fairview Ave. N/Eastlake Ave.	A	0.41	A	0.41	A	0.41	A	0.41
SR520/Harvard Ave. Interchange								
Roanoke St./10th Ave. E	B	0.76	B	0.76	A	0.72	A	0.75
Harvard Ave./Roanoke St./SR 520 WB Off Ramp	D	1.15	D	1.15	D	0.96	D	1.01
Roanoke St./Boylston Ave. E	C	0.88	C	0.88	C	0.88	B	0.85
SR520/Montlake Blvd. Interchange								
Montlake Blvd./E Roanoke St.	B	0.79	B	0.79	B	0.85	B	0.88
Lake Washington Blvd./SR 520 EB On/WB Off Ramps	E	N/A	E	N/A	D	1.11	A	0.72
Montlake Blvd. NE/SR 520 EB Ramp	F	2.23	F	2.23	F	1.91	F	1.87
Montlake Blvd. NE/SR 520 WB Ramp	N/A	N/A	N/A	N/A	D	1.90	D	1.33
Montlake Blvd. NE/E Hamlin St.	C	1.12	C	1.12	A	0.96	A	0.97
Montlake Blvd. NE/E Shelby St.	E	1.19	E	1.19	D	1.15	D	1.20
Montlake Blvd. NE/NE Pacific St.	E	1.31	E	1.31	E	1.21	E	1.22
Montlake Blvd. NE/NE Pacific Pl.	C	1.01	C	1.01	B	0.92	C	1.03
Montlake Blvd. NE/25th Ave. NE	A	0.86	A	0.86	B	0.93	B	0.78
Montlake Blvd./Walla Walla Rd./NE 44th St.	A	0.78	A	0.78	A	0.86	A	0.90
Montlake Blvd./NE 45th St.	B	0.84	B	0.84	B	0.90	B	0.92
25th Ave. NE/Pend Oreille Rd./NE 44th St.	B	0.77	B	0.77	A	0.72	C	0.87
NE Pacific St./NE Pacific Pl.	D	1.03	D	1.03	A	0.93	A	0.85
NE Pacific St./15th Ave. NE	C	0.95	C	0.95	D	0.93	D	0.94
Below-Grade Tunnel Intersection							A	0.69

Table 56 (cont'd). 2030 Westside Alternatives Traffic Operations Summary – AM Peak Hour

	No Action		Safety & Preservation		6-Lane Build		8-Lane Build	
Intersection	**LOS**	**V/C**	**LOS**	**V/C**	**LOS**	**V/C**	**LOS**	**V/C**
Pacific St. Extension/SR 520 WB Off-ramp							A	0.58
SR 520/Montlake Blvd. Interchange (with 2nd parallel bascule bridge)								
Montlake Blvd./E Roanoke St.					B	0.85		
Montlake Blvd. NE/SR 520 EB Ramps					F	1.70		
Lake Washington Blvd./SR 520 EB On/WB Off Ramps					D	1.11		
Montlake Blvd. NE/SR 520 WB Ramps					D	1.19		

Table 57. 2030 Eastside Alternatives Traffic Operations Summary – AM Peak Hour

	No Action		Safety & Preservation		6-Lane Build		8-Lane Build	
Intersection	**LOS**	**V/C**	**LOS**	**V/C**	**LOS**	**V/C**	**LOS**	**V/C**
84th Ave. NE Interchange								
84th Ave. NE/SR 520 WB Off Ramp	B	0.63	B	0.63	B	0.62	B	0.62
84th Ave. NE/Hunts Point Circle	E	1.06	E	1.06	E	1.03	E	1.06
92nd Ave. NE Interchange								
92nd Ave. NE/SR 520 EB On /Points Dr.	A	0.11	A	0.11	A	0.45	A	0.48
92nd Ave. NE/SR 520 WB Off/NE 33rd St.	F	0.95	F	0.95	F	1.33	F	1.24
Bellevue Way Interchange								
Bellevue Way/NE 38th Pl.	B	0.93	B	0.93	A	0.68	B	0.85
Bellevue Way/NE Northup Way	C	0.88	C	0.88				
Bellevue Way/NE Points Drive					B	0.88	B	0.85
Bellevue Way/SR 520 WB On/EB Off Ramps					C	0.91	C	0.86
Bellevue Way/SR 520 EB On/WB Off Ramps					B	0.70	B	0.66
Bellevue Way/NE 34th Pl.					B	0.77	A	0.77
108th Ave. NE Interchange								
108th Ave. NE/SR 520 EB On Ramp	D	0.56	D	0.56				
108th Ave. NE/SR 520 WB Ramps	B	0.91	B	0.91				
108th Ave. NE/NE Northup Way	E	1.10	E	1.10	D	0.98	C	0.93
108th Ave. NE/HOV Direct Access Ramps					A	0.26	A	0.27
108th Ave. NE/NE 34th Pl.					B	0.75	B	0.74
124th Ave. NE Interchange								
124th Ave. NE/Northup Way	C	0.77	C	0.77	C	0.90	C	0.76
120th Ave. NE/Northup Way	A	0.57	A	0.57	C	0.97	B	0.94
NE 24th St./Northup Way	B	0.71	B	0.71				
116th Ave. NE (north T)/Northup Way	B	0.89	B	0.89	D	1.09	D	1.02
116th Ave. NE (south T)/Northup Way	C	0.96	C	0.96				
I-405 NB On & Off Ramps/Northup Way					B	0.83	D	1.13
I-405 SB On & Off Ramps/Northup Way					C	0.96	C	0.93
148th Ave. NE Interchange								
148th Ave. NE/NE 24th St.	E	1.28	E	1.28	F	1.76	E	1.31
148th Ave. NE/SR 520 EB Ramps	D	1.07	D	1.07	D	1.18	B	0.95
148th Ave. NE/SR 520 WB Ramps/NE 29th St.	C	1.02	C	1.02	D	0.98	D	0.98

Table 57 (cont'd). 2030 Eastside Alternatives Traffic Operations Summary – AM Peak Hour

Intersection	No Action		Safety & Preservation		6-Lane Build		8-Lane Build	
	LOS	V/C	LOS	V/C	LOS	V/C	LOS	V/C
NE 51st St. Interchange								
NE 51st St./SR 520 WB Ramps	B	0.84	B	0.84	C	0.93	B	0.77
NE 51st St./SR 520 EB Ramps	B	0.85	B	0.85	C	0.96	B	0.92
NE 40th St. Interchange								
NE 40th St./SR 520 WB Ramps	C	0.88	C	0.88	C	0.95	C	0.86
NE 40th St./SR 520 EB Ramps	D	1.11	D	1.11	D	1.36	D	1.34
NE 40th St./156th Ave. NE	F	1.61	F	1.61	F	1.49	F	1.56
W Lake Sammamish Pkwy Interchange								
SR 520 EB Ramps/W Lake Sammamish Pkwy.	F	1.65	F	1.65	F	1.60	F	1.75
SR 520 WB Ramps/W Lake Sammamish Pkwy./NE Leary Way	F	1.61	F	1.61	F	2.77	F	1.35
159th Pl. NE/NE Leary Way	B	0.92	B	0.92	A	0.60	A	0.65
Bear Ck. Pkwy//NE Leary Way	A	0.92	A	0.92	B	0.84	B	0.83
Bear Ck. Pkwy//NE 74th St.	B	0.18	B	0.18	B	0.46	B	0.43
Redmond Way Interchange								
Redmond Way/SR 520 WB On	C	0.98	C	0.98	B	0.92	B	0.92
Redmond Way/SR 520 EB Off	C	1.02	C	1.02	B	0.84	B	0.85
NE 76th St./SR 520 WB Off	C	0.25	C	0.25	B	0.91	C	0.81
NE 76th ST./SR 520 EB On	A	0.25	A	0.25	A	0.32	A	0.37
Redmond Way/NE 70th St.	B	0.78	B	0.78	C	0.88	B	1.02
E Lake Sammamish/180th Ave./Redmond Way	D	1.00	D	1.00	D	1.03	E	1.16
Avondale Way Interchange								
Avondale Rd. NE/NE Union Hill Rd.	A	0.59	A	0.59	A	0.80	B	0.56
Union Hill Road/Avondale Rd. Extension	E	1.18	E	1.18	F	1.25	E	1.14
Avondale 520 Extension/Avondale Rd.	A	0.80	A	0.80	A	0.75	A	0.93

Table 58. 2030 Westside Alternatives Traffic Operations Summary – PM Peak Hour

	No Action		Safety & Preservation		6-Lane Build		8-Lane Build	
Intersection	**LOS**	**V/C**	**LOS**	**V/C**	**LOS**	**V/C**	**LOS**	**V/C**
I-5/Stewart St. Interchange								
Denny Way/Stewart St.	B	0.84	B	0.84	B	0.76	B	0.84
John St./Eastlake Ave.	B	0.67	B	0.67	B	0.61	B	0.61
I-5/Mercer St. Interchange								
Mercer St./Fairview Ave./I-5 Ramps	F	1.86	F	1.86	F	1.69	F	1.77
Valley St./Fairview Ave. N	F	1.27	F	1.27	D	1.08	D	1.08
Fairview Ave. N/Eastlake Ave.	B	0.83	B	0.83	A	0.62	A	0.64
SR520/Harvard Ave. Interchange								
Roanoke St./10th Ave. E	B	0.97	B	0.97	A	0.78	A	0.81
Harvard Ave./Roanoke St./SR 520 WB Off Ramp	F	1.38	F	1.38	E	1.32	E	1.32
Roanoke St./Boylston Ave. E	B	0.86	B	0.86	B	0.86	B	0.86
SR520/Montlake Blvd. Interchange								
Montlake Blvd./E Roanoke St.	A	0.67	A	0.67	B	0.73	B	0.73
Montlake Blvd. NE/SR 520 EB Ramp	F	1.65	F	1.65	E	1.24	F	1.69
Montlake Blvd. NE/SR 520 WB Ramp	N/A		N/A		A	0.94	A	0.83
Montlake Blvd. NE/E Hamlin St.	B	1.03	B	1.03	B	1.00	B	0.99
Montlake Blvd. NE/E Shelby St.	F	1.32	F	1.32	E	1.25	B	1.01
Montlake Blvd. NE/NE Pacific St.	E	1.32	E	1.32	D	1.16	D	1.25
Montlake Blvd. NE/NE Pacific Pl.	F	1.63	F	1.63	E	1.22	F	1.29
Montlake Blvd. NE/25th Ave. NE	A	0.86	A	0.86	A	0.84	A	0.80
Montlake Blvd./Walla Walla Rd.	B	0.97	B	0.97	B	0.97	A	0.88
Montlake Blvd./NE 45th St.	C	1.06	C	1.06	C	1.06	B	0.95
25th Ave. NE/Pend Oreille Rd./NE 44th St.	B	0.62	B	0.62	B	0.57	B	0.66
NE Pacific St./NE Pacific Pl.	C	0.92	C	0.92	B	0.92	B	0.94
NE Pacific St./15th Ave. NE	D	0.95	D	0.95	C	0.89	C	0.89
Lake Washington Blvd./SR 520 EB On/WB Off Ramps	F	N/A	F	N/A	B	0.88	B	0.97
Below-Grade Tunnel Intersection							A	0.98
Pacific St. Extension/SR 520 WB Off-Ramp							D	1.09
SR 520/Montlake Blvd. Interchange (with 2nd parallel bascule bridge)								
Montlake Blvd./E Roanoke St.					B	0.73		
Montlake Blvd. NE/SR 520 EB Ramps					E	1.24		
Lake Washington Blvd./SR 520 EB On/WB Off Ramps					B	0.89		
Montlake Blvd. NE/SR 520 WB Ramps					A	0.94		

Table 59. 2030 Eastside Alternatives Traffic Operations Summary – PM Peak Hour

	No Action		Safety & Preservation		6-Lane Build		8-Lane Build	
Intersection	**LOS**	**V/C**	**LOS**	**V/C**	**LOS**	**V/C**	**LOS**	**V/C**
84th Ave. NE Interchange								
84th Ave. NE/SR 520 WB Off Ramp	B	0.68	B	0.68	B	0.68	B	0.68
84th Ave. NE/Hunts Point Circle	E	1.06	E	1.06	E	1.06	E	1.06
92nd Ave. NE Interchange								
92nd Ave. NE/SR 520 EB On /Points Dr.	A	0.27	A	0.27	A	0.46	A	0.48
92nd Ave. NE/SR 520 WB Off/NE 33rd St.	E	0.86	E	0.86	F	0.91	F	0.92
Bellevue Way Interchange								
Bellevue Way/NE 38th Pl.	E	1.34	E	1.34	C	0.90	C	1.02
Bellevue Way/NE Northup Way	D	1.10	D	1.10				
Bellevue Way/NE Points Drive					E	1.17	C	1.06
Bellevue Way/SR 520 WB On/EB Off Ramps					D	1.25	D	1.09
Bellevue Way/SR 520 EB On/WB Off Ramps					C	0.91	C	1.09
Bellevue Way/NE 34th Pl.					C	0.96	D	1.23
108th Ave. NE Interchange								
108th Ave. NE/SR 520 EB On Ramp	F	1.76	F	1.76				
108th Ave. NE/SR 520 WB Ramps	B	0.90	B	0.90				
108th Ave. NE/NE Northup Way	F	1.18	F	1.18	D	0.95	E	1.18
108th Ave. NE/HOV Direct Access Ramps					A	0.55	A	0.57
108th Ave. NE/NE 34th Pl.					C	0.94	C	0.96
124th Ave. NE Interchange								
124th Ave. NE/Northup Way	C	0.85	C	0.85	C	0.94	D	0.98
120th Ave. NE/Northup Way	C	0.89	C	0.89	D	1.17	D	1.11
NE 24th St./Northup Way	C	1.05	C	1.05				
116th Ave. NE (north T)/Northup Way	C	1.09	C	1.09	D	1.16	D	1.15
116th Ave. NE (south T)/Northup Way	D	1.03	D	1.03				
I-405 NB On & Off Ramps/Northup Way					B	0.95	D	1.15
I-405 SB On & Off Ramps/Northup Way					D	1.14	D	1.03
148th Ave. NE Interchange								
148th Ave. NE/NE 24th St.	F	1.47	F	1.47	F	1.59	F	1.55
148th Ave. NE/SR 520 EB Ramps	C	1.01	C	1.01	C	1.11	C	1.04
148th Ave. NE/SR 520 WB Ramps/NE 29th St.	F	1.71	F	1.71	E	1.37	E	1.36

Table 59. (cont'd). 2030 Eastside Alternatives Traffic Operations Summary – PM Peak Hour

Intersection	No Action		Safety & Preservation		6-Lane Build		8-Lane Build	
	LOS	V/C	LOS	V/C	LOS	V/C	LOS	V/C
NE 51st St. Interchange								
NE 51st St./SR 520 WB Ramps	A	0.57	A	0.57	A	0.63	A	0.64
NE 51st St./SR 520 EB Ramps	C	0.98	C	0.98	C	0.89	C	0.97
NE 40th St. Interchange								
NE 40th St./SR 520 WB Ramps	C	1.11	C	1.11	B	0.79	C	1.15
NE 40th St./SR 520 EB Ramps	B	0.81	B	0.81	B	0.82	B	0.92
NE 40th St./156th Ave. NE	F	1.81	F	1.81	E	1.23	E	1.17
W Lake Sammamish Pkwy Interchange								
SR 520 EB Ramps/W Lake Sammamish Pkwy.	F	2.08	F	2.08	F	1.99	F	2.06
SR 520 WB Ramps/W Lake Sammamish Pkwy./NE Leary Wy	F	2.78	F	2.78	F	2.24	F	2.41
159th Pl. NE/NE Leary Wy	F	6.65	F	6.65	F	1.48	F	1.46
Bear Ck. Pkwy/NE Leary Wy	F	1.93	F	1.93	F	1.69	F	1.69
Bear Ck. Pkwy/NE 74th St.	F	1.36	F	1.36	D	0.98	C	1.04
Redmond Way Interchange								
Redmond Way/SR 520 WB On	E	1.09	E	1.09	D	1.10	E	1.28
Redmond Way/SR 520 EB Off	D	1.06	D	1.06	F	1.35	F	1.64
NE 76th St./SR 520 WB Off	E	0.77	E	0.77	B	0.91	B	0.85
NE 76th St./SR 520 EB On	A	0.48	A	0.48	A	0.53	A	0.61
Redmond Way/NE 70th St.	E	1.20	E	1.20	E	1.17	E	1.50
E Lake Sammamish/180th Ave/Redmond Way	D	1.10	D	1.10	D	1.O4	D	1.20
Avondale Way Interchange								
Avondale Rd. NE/NE Union Hill Rd.	D	1.17	D	1.17	C	1.01	C	1.01
Union Hill Rd./Avondale Rd. Extension	F	1.30	F	1.30	E	1.18	F	1.37
Avondale 520 Extension/Avondale Rd.	E	1.31	E	1.31	E	1.16	F	1.33